

COAL AGE

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COMPETITION on the part of laboring men themselves has ever been the chief force to beat down wages. To overcome this condition has been the first aim of labor unions. The principal argument advanced to justify the organization of workingmen is parallel with the idea that a theatre or other crowded building can be more speedily and safely emptied when accomplished in accord with some systematic plan.

Labor leaders discourage tumultuous action, where each person pursues his own individual interest with ignorance, passion and fear. Also, they have accepted as their own the modern idea that "an increase in wages by raising a man's laboring power may enlarge the product proportionately; that underfeeding, whether of man or animals, is false economy."

The question uppermost in our minds to-day, however, is whether strikes are necessary and advisable measures for the betterment of workingmen's social conditions. One or two generations ago, labor wars in England, although not as frequent, were invariably successful. The men were striving simply for enough to eat. Unfair laws had reduced them below the economic point of subsistence. Wage controversies to-day are not always for such a palpable cause.

As to the success or failure of workmen in their contests with employers, no one should so lack in discernment as to believe that when a strike fails to advance wages, the laborers have lost in their fight. We might as well believe the French Revolution was a failure because the Bourbons were restored to power. The king and princes returned, but to rule a new France. The master may remain master, but the dread of another conflict makes the old regime forever impossible.

There is no constructive or healing virtue in a strike. Insurrections of labor, like uprisings in the political body, are purely destructive agencies. Yet, as a rebellion against corrupt government may destroy political institutions that have outlived their usefulness, so a labor war may break up a crust of custom which has formed over the remuneration of a class of workmen.

However, a strike can only justify itself by its results, and unless it makes way for a better order of things, it is waste of the worst sort. Not only is production curtailed, but bad blood and bad habits result from the enforced idleness. Few of us but abhor strikes, and pray for the advent of a saner method of eliminating poverty and restoring freedom. Still we all have to admit that nothing so quickens the sense of justice and equity as does the consciousness that unfair acts are likely to be promptly and fearlessly resisted.

As to the real cost of a strike, and the actual money losses incurred, the truth is that we generally overestimate the dire results. In an industry like coal mining where the productive capacity is so far above requirements, a cessation of work, if not too prolonged, frequently results in clearing up the market situation, and eventually brings benefit to operator and miner alike. Enforced idleness is always succeeded by increased activity and the loss of time is soon made good.

The danger to business of all kinds today is not so much from spontaneous strikes brought about by inhuman, unjust treatment of workmen by employers, but from shut-downs ordered by trades-unions and founded on exactions that cannot be maintained. It often occurs that a slim minority, who give scant consideration to the equities of distribution, frame demands that are both offensive and impossible, and which owners could not concede, if they would, without checking production and diminishing employment.

There is a singular impotence in conspiracy. This is shown by the fact that the most successful strikes arise from a common sense of injury to an outraged body of workmen. Frequently when plans have been carefully made and the machinery of insurrection extensively employed, the attempt to better wages has ended in ignominious failure. When labor is organized to a point of military discipline and the men are under obligation to obey all decrees, action of doubtful legality or expediency is apt to be prompt and arbitrary. *In our next issue, we will endeavor to show how the unwise and improper exercise of newly acquired power is likely to hinder rather than help the workingman's cause.*

The Dewar, Oklahoma, Coal Field

By John A. Garcia *

The coal-mining town of Dewar, Okla., is located on the edge of what is probably the greatest oil field in the West, in Okmulgee County, on the Coalton branch of the Missouri, Oklahoma & Gulf R.R., and about three miles east of the older and well known town of Henryetta, on the 'Frisco Road. Two years ago Dewar was only a water tank and coaling station for the M. O. & G., and nearby were a few slope mines, operated under lease in a very crude and spasmodic fashion, producing nothing in the summer and about 50 to 130 tons per day in winter.

No incentive or encouragement of any kind was offered for the development of the field, mainly because of the oil and

The Dewar field is an excellent example, on a small scale, of the benefits derived by consolidating the small individual operators. The "gopher" system of mining has been succeeded by more modern methods and electricity is being successfully applied. A rather surprising and unusual feature, for a coal mine, is the practice of burning natural gas in the boilers.

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prepared and sold at a reasonable price would find a ready market on the new M. O. & G. R.R., then building down through Oklahoma into Texas.

After thoroughly investigating the operating conditions, and being satisfied that they could be handled and the coal placed on cars at a reasonable figure, the several operations were bought up and some 3000 acres of coal acquired. The Oklahoma Coal Co. was formed, organization perfected, and the work of rehabilitation and reconstruction begun.

Several of the older producing mines with but a short life ahead, were leased to responsible parties on a royalty basis, while the operations having good prospects for a future were surveyed,



SURFACE PLANT AT MINE NO. 3, SHOWING TYPICAL ARRANGEMENT AT A SHAFT MINE

gas produced in the immediate neighborhood. This latter is used as a fuel and illuminant by practically all the railroads, manufacturing plants and for domestic purposes, in fact these pioneer coal operators found it more economical to tap the pipe lines running past the mines and use gas under the boilers and for lighting the few houses in the camp. The famous Kiefer oil field is only 40 miles from Dewar and a capped

gas well, said to be the largest in this country, was drilled on the edge of the town and plugged up as there was no market for the product.

ECONOMIC CONSIDERATIONS

The promoters of the Oklahoma Coal Co., after carefully considering the question of competition from oil and gas, decided that such competition had a very limited future and that a good coal, well

mapped and projected. The haulage-ways were then brushed and graded, ventilation established and the mines overhauled generally from top to bottom. Most of the mines had been ventilated by furnaces and, as it was obviously impossible to successfully operate for large tonnages with these, fans were installed at all the mines. These are all of the suction type and the slopes are made the intake.

METHODS OF WORKING

The accompanying halftone shows the No. 3 mine which is a shaft about 70 ft. deep and will be the banner mine of the field. All the coal is caged on one side, and the empty cars run by gravity to run-a-round; the cage room is double tracked and long enough for the storage of 60 cars. Overcasts are used at each pair of cross entries and there are no doors on the main entries. Various other improvements, which are common enough in other states, but considered rather revolutionary at Dewar have been installed.

The railroad follows the outcrop of the coal which can be readily traced along the foot of the hill all the way to Coalton and beyond. The seam measures from 3 ft. to 3 ft., 4 in., has practically no partings, and is a clean, hard, low-ash coal, with a high calorific value. The roof is a hard, sandy shale and is brushed in entries to a height of 5 ft. above the rail and 6 ft. wide; the bottom is a very hard fire clay, except for the first 6 in. or so, which is soft enough to permit of machine mining were it

that by means of a tail-rope the mule haulage on main roads will be materially reduced.

SHOOTING FROM THE SOLID

Before the advent of the Oklahoma Coal Co. all coal was shot off the solid, except in No. 8 where the clay was mined by hand and an excellent grade of lump coal produced. The great difference in the mining rate, however, (80½c. for solid and \$1.05 for pick-mining) and the fact that only the coal with thin cover could be hand mined forced all mines to the solid basis; this has resulted in high percentages of screenings, windy shots and the other innumerable evils which accompany this system. The mines generate no explosive gases and this, together with the fact

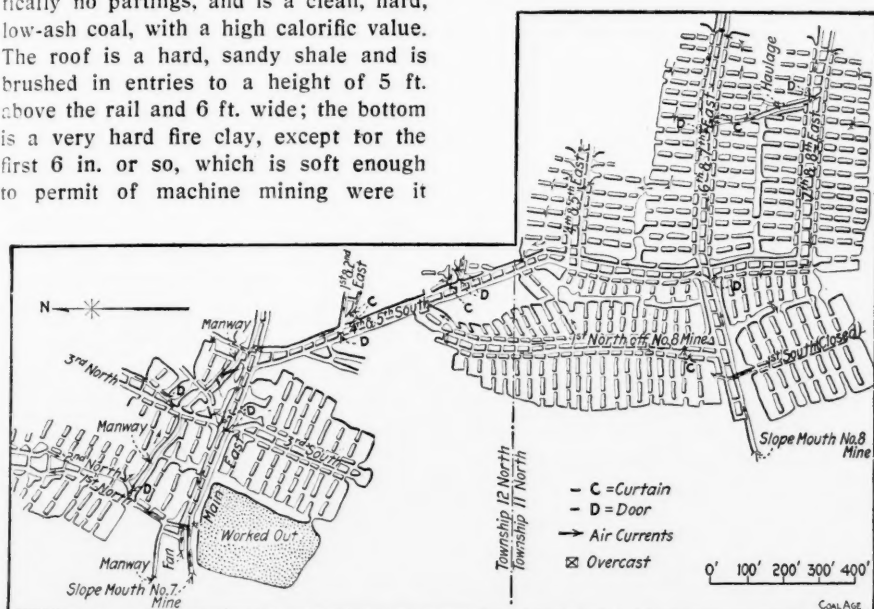
The Sullivan short-wall chain machine was finally adopted as a standard, but on the test run with a breast-machine, to determine the proper differential, the miners running the breast-machine were a little to smart for the company men operating the short-wall, and the differential between the two types was established, at only 2½c. per ton, fixing the machine scale at 78 cents.

POWER PLANT

Electricity for the machines at the various mines is supplied from a central power plant located near No. 5 mine, equipped with a 300-kw., 2200-volt, alternating current, General Electric generator, direct connected to a 21x20-in. Ridgway engine. The power is distributed to the mines over a pole line carrying 3, No. 0 wires, securely fastened to porcelain insulators and made as inaccessible as possible. Motor generator sets are provided at mines Nos. 6, 7 and 8, and there is a transformer at No. 7 for operating the electric hoist. At No. 5 the power is supplied by a 75-kw., direct current, 250-volt, generator which the company had on hand. The boilers are arranged in a battery of 3, and are 18 ft. by 72 in., of 150 hp. each, gas fired and built by the Casey-Hedges Co., Chattanooga, Tenn. Both boiler and engine room are arranged for an additional 300-kw. generator, the necessary boiler power to be installed when development of the mines require it.

Because of the rock top and freedom from water, the mines can be shut down in the summer months and reopened in a few days' time at a nominal expense; on account of the competition of the oil and gas, there is little or no demand for coal through the summer, so that the fact that the mines can stand a long shut down without injury is a very valuable condition, without which it is questionable whether or not they could be profitably operated. The operators on the M. O. & G., however, believe that the six months operating and six months shut down arrangement, will not obtain much longer for the mines on that road, since the product is sent into the large cities in Texas and through a country where the domestic fuel consumption is rapidly increasing.

With anything like fair running time, these mines in the Dewar district will, when fully developed, have a marked influence on the coal business in Oklahoma. They are free from the usual unfavorable conditions such as gas and depth and the heavy pitch so that the production cost will be comparatively low and this fact, together with the good quality of the product and the location on a coal road, make a strong combination in the competitive market.



THE OKLAHOMA COAL CO.'S MINES NOS. 7 AND 8, AT DEWAR, OKLAHOMA

not for occasional boulders and rough places in the floor.

The coal pitches at the outcrop on an angle varying from 5° to 20° for about 100 ft. From that point on there is no regular inclination or pitch, but enough variation in grades to make the systematic projection of workings very difficult and in some instances impossible; especially is this so at the present time when all hauling, except on the main entries at No. 7 mine, is done by mules.

The accompanying map shows the workings of the combined Nos. 7 and 8 mines. The irregular system of working is due to the extreme variation in the pitch of the seam and to the gophering methods commonly used under the old leasing system of Oklahoma where no fixed percentage of extraction was demanded.

An electric hoist is used to pull the trips up the slope at No. 7 mine and partings are now being built inside so

that the brushing mixes powdered shale with the coal dust, probably accounts for the fact that there has been no explosion or even serious windy shot in the history of these mines.

Chain machines were tried in the No. 6 mine. They were tested in the clay bottom and in the coal and several makes of machines, including both breast- and short-wall, were tried. The tests covered a period of six months and met with uniform and consistent success in each instance, with, however, the customary variation in efficiencies for the different makes of machines due partly to design and partly to the machine men. The machines readily mined the clay but it took so much more power, and was so difficult to keep the nose of the machine in the clay, that it was decided to cut the coal only, though it meant about 14% fine coal to begin with and 5 in. less height, which is an important matter in a 36-in. seam.

Water Purification for Collieries

In a previous article, it was stated that the subject of water purification for collieries could be dealt with best under the two general heads of hot and cold methods of treatment, and one notable system of water softening by the cold process was described in detail. In some of the types of water-softening apparatus made by Lassen & Hjort, the cold process is used and lime is employed as the reagent.

This form of apparatus will best be understood by reference to Fig. 1. In general it consists of a combination of a measuring and mixing apparatus, settling tanks and a filter, for the purpose of removing the precipitated impurities from the water. The hard water, on entering the softener, passes alternately to each of the two compartments of a tipping device, which oscillates on a horizontal shaft. When either of these compartments is filled with water, the center of gravity is shifted, causing the tipper to over-balance and discharge its contents into an inclosing tank. This brings the other compartment of the tipper under the inlet pipe and it is in turn filled, the center of gravity then being shifted to the opposite side and the tipper caused to overturn in the reverse direction.

LIME MILK ADDED IN DEFINITE QUANTITIES

In this way the oscillation of the tipper is such as to discharge a definite volume of water into the tank at each stroke. Following each discharge, a corresponding amount of water is displaced from the tank and led through a stand-pipe and chute into the reaction chamber of the softener. At the same moment, the requisite charge of chemical solution is delivered through a valve placed on the bottom of the semicircular chemical container *D*, and operated by the tipper. This valve can be regulated, while working, to discharge the exact quantity of reagent required by the volume of water in the tipper compartment, and in this way the proper amount of reagent, which is calculated to reduce the hardness to a guaranteed figure, is added without altering the solution in the chemical container.

Lime milk, of a 10 per cent. strength, is generally used for the lime reaction, and as this milk has a strength nearly 100 times that of lime water it is possible to employ tanks of a correspondingly smaller size than those required when the latter mixture is used as a reagent. Moreover, since a known quantity of lime can in this case be mixed with a known quantity of water, the strength of the solution obtained is definite. The heavier portion of the precipitate settles on the bottom of the re-

Special Correspondence

Undesirable water may be prepared for use in boilers and for other purposes by the addition of chemical reagents, by preheating, or by a combination of the two methods. Several hot and cold processes are here outlined and the manner of their operation explained. The second of a series of articles on water purification.

action chambers and is discharged from them daily by opening the sludge valves for a few moments. The finer portions of the precipitate are removed by wood-wool filters, packed between rows of wooden bars.

operates inside the tank for the purpose of rendering the mixture homogeneous. In this way a lime milk or sludge of uniform quality is transferred to the container. The pump may be operated either by hand or by power, and in some cases, is driven by a water motor which is connected to the supply of hard water on its way to the softener.

A number of successful installations operating on the Lassen & Hjort principle have been effected at collieries in Great Britain, and other mining installations have been made in places as distant as Mysore, Wallaroo, Huelva, Kobe and Servia. A most interesting plant is one with a capacity of 18,000 gal. per hour, installed at the Askern colliery at Doncaster.

AUTOMATIC MEASURING OF REAGENTS

A mechanism somewhat similar to the foregoing, is that of the "Eradica" water

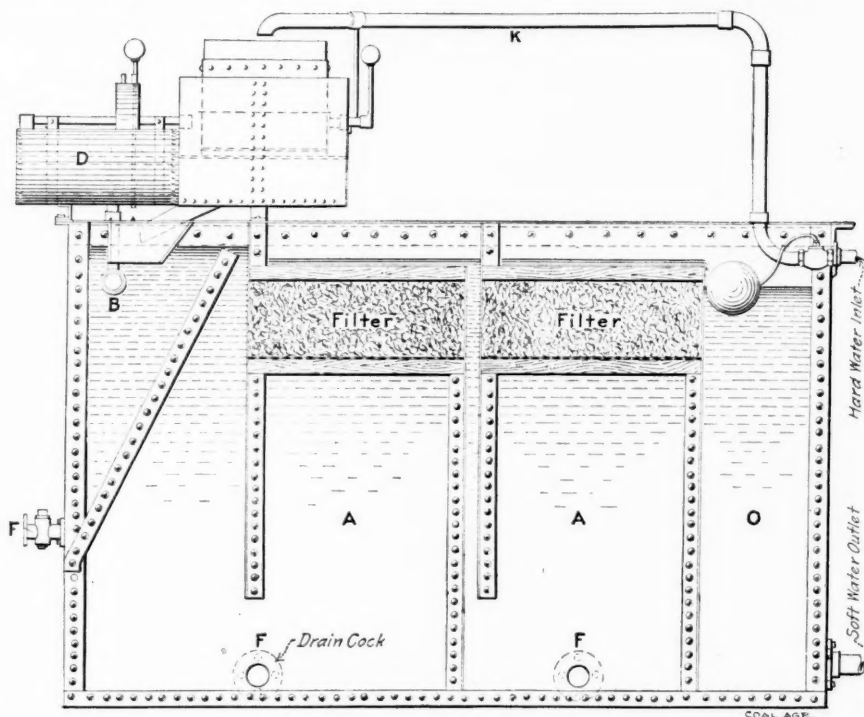


FIG. 1. LASSEN & HJORT COLD PROCESS WATER SOFTENER

In some cases, Messrs. Lassen & Hjort's softeners are made cylindrical instead of square in form, but this difference is purely mechanical, the method of operation being the same. The cylindrical type, however, allows the discharge to be taken off at a higher level. The chemical container, which is calculated to hold from 10 to 12 hours' supply, is frequently supplemented by a mixing tank, placed on the ground level, with a capacity sufficient to fill the container several times. A pump is employed to supply the solution to the container, and an overflow pipe brings back any excess. Connected with the pump gear, is an agitator which

purifier, manufactured by Messrs. Ashwell & Nesbit, Ltd., of Leicester. The measuring apparatus, in this case also, consists of several oscillating vessels, arranged alongside one another on the same shaft, each auxiliary vessel being connected by an annular passage to the one used for measuring the untreated water. The crude water first flows into the main vessel and is then distributed in definite proportions to the one or more subsidiary compartments. The size of these subsidiary vessels is adjustable and can be arranged to deliver a definite volume of displacing water either to a lime saturator or soda-solution tank.

The arrangement of one form of this measuring apparatus is shown in Fig. 2, in plan and vertical section. It will be noted that a definite volume of water is delivered to each reagent receptacle in proportion to the volume of crude water measured out for purification. Both lime and soda reagents are used in diluted form. Except for charging the lime saturator and soda solutioner and sludging the apparatus, the installation works automatically.

Before passing to the consideration of softeners in which use is made of steam, it will be interesting to refer to the "Reisert" type of purifier which has been supplied to a number of collieries, among which may be mentioned those of R. Evans & Co., of Golborne, near St.

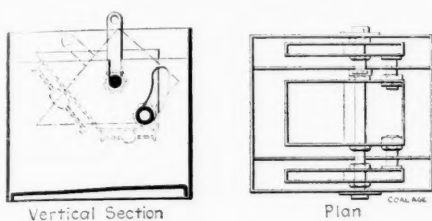


FIG. 2. MEASURING DEVICE

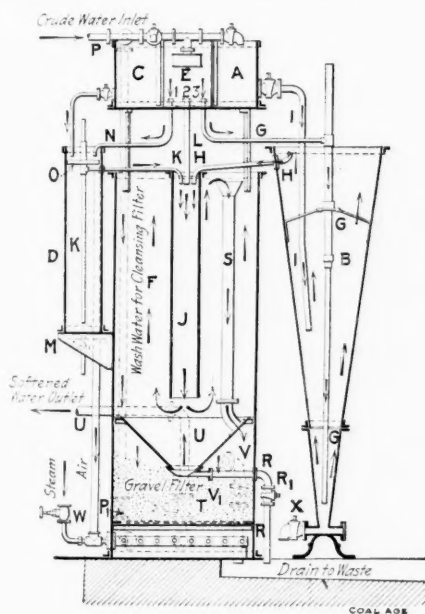


FIG. 3. REISERT PURIFIER

Helens, where there is a plant dealing with 4400 gal. per hour. The general arrangement of the softener is shown in Fig. 3.

FEEDING IN THE SODA SOLUTION

Lime, slaked in a vessel *A*, is run down a pipe marked *I* into a conical chamber *B*, after the previous spent charge has been run to waste. A regular and known quantity of water passes through the micro-valve marked 3 along a pipe *G* to the bottom of the cone and then upward through the slaked lime, becoming saturated, but not over-saturated, with the lime. As the water proceeds upward

its velocity diminishes, owing to the expanding nature of the container and any excess particles of lime settle back until they are dissolved in additions of water. The lime water then passes in a perfectly clear state to the top of the vessel *B*.

A certain quantity of soda is dissolved in the container *C* and runs into the vessel *D*. A regulated quantity of water passes into the top of *D* by way of the micro-valve 1 and the pipe *N*. Since the

ture of the reagent solutions and the crude water is carried down pipe *J* to the bottom of the reaction chamber. A certain proportion of the precipitated matter is deposited and sludged out by the cock *R* from time to time. The water then overflows from the reaction chamber to the gravel filter *T* where all suspended and floating matter is arrested.

In order to clean the filtering material, a mud outlet valve *V* is opened,

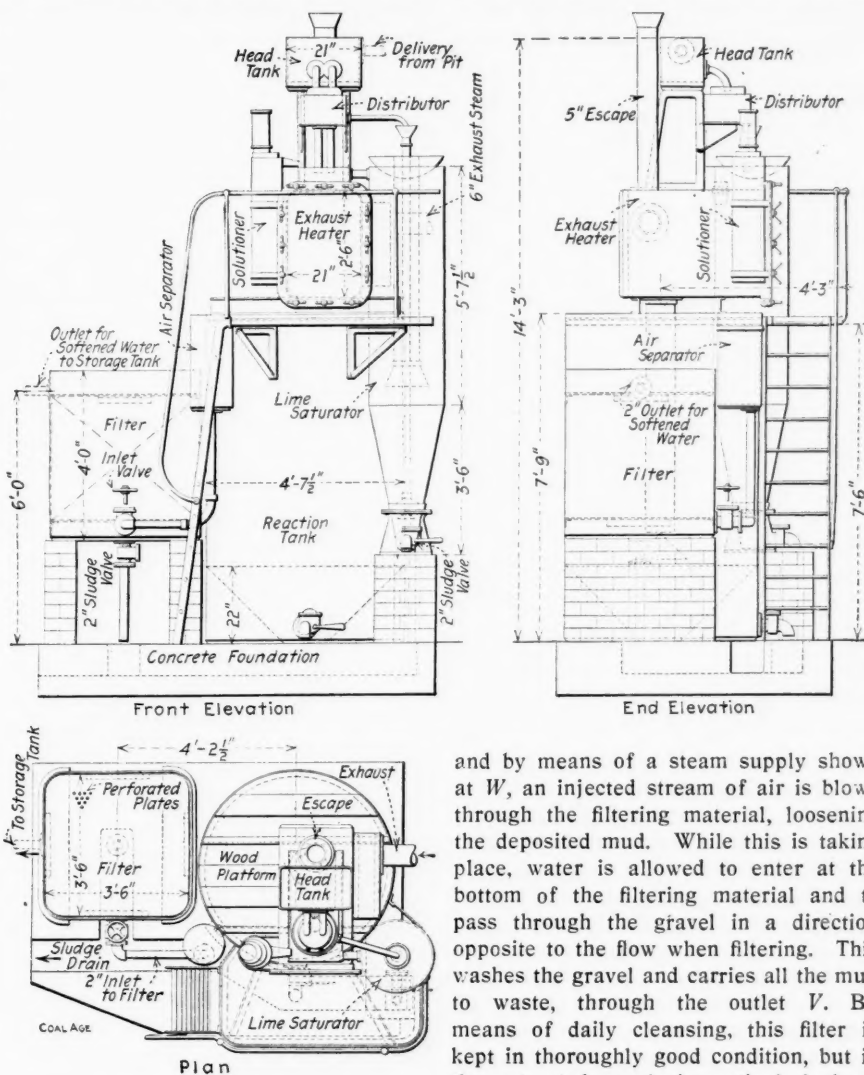


FIG. 4. HEATER AND SOFTENER

specific gravity of the soda solution is greater than that of water, it settles to the bottom of the tank, and the incoming crude water is discharged on the float *O* in order to prevent any mixing in the top layers. As the level of the soda solution gradually sinks in the vessel *D*, some little head is required to force it up the pipe *K* as far as the discharge. Consequently the amount of soda solution passing to the mixing pipe *J* is proportional to the amount of water flowing in from the micro-valve 1.

The third quantity of crude water passes directly to the mixing pipe *J* through the micro-valve 2. All these three micro-valves are under the same head so that proportionality is preserved. The mix-

and by means of a steam supply shown at *W*, an injected stream of air is blown through the filtering material, loosening the deposited mud. While this is taking place, water is allowed to enter at the bottom of the filtering material and to pass through the gravel in a direction opposite to the flow when filtering. This washes the gravel and carries all the mud to waste, through the outlet *V*. By means of daily cleansing, this filter is kept in thoroughly good condition, but if the untreated supply is particularly hard and dirty, as is possible in the case of mine water, purified water is used for cleaning the filter.

PREHEATING WITH EXHAUST STEAM

The availability of exhaust steam, from hoisting engines and similar sources at the collieries has made it extremely convenient, in a good many cases, to do without the use of lime for the removal of temporary hardness, and to employ steam to boil the water before entering the boiler, thus removing its calcium and magnesium carbonates. However, where there is also permanent hardness in the water, a combined heater-softener is employed. In this, the action of steam is combined with the injection into the water of a softening solution, usually of soda ash.

The various manufacturers of water-softening apparatus install hot processes, where required, instead of the cold processes already mentioned and but little alteration in the details of design is necessary in order to adapt the plants above described to the functions of the hot process. It will, therefore, not be necessary to recapitulate these designs in detail. In the Lassen & Hjort combined water heater and softener, for example, the water measured and mixed with chemicals, as described above, is heated to the boiling point by means of exhaust steam led into the precipitating chamber. This chamber is provided with a guide plate and sludge cock to facilitate the removal of the large quantities of precipitate which are deposited here. The further deposition of the heavier precipitate takes place in a settling chamber. The water is then filtered, settled and again filtered before passing to the storage tank.

In this type of softener the use of lime is not dispensed with. The makers point to the fact that exhaust steam usually contains a considerable amount of oil, and unless this is coagulated by the action of the lime, it is apt to be carried over into the boilers. This system, it is claimed, effects softening independently of the use of heat.

COMBINED HEATER AND SOFTENER

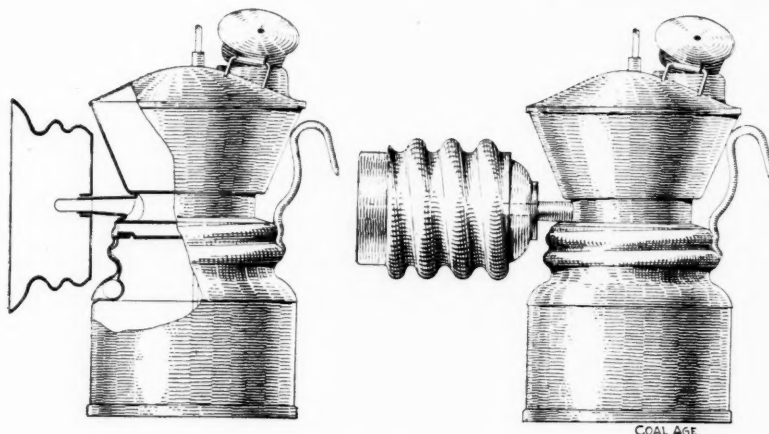
One of the Harris-Anderson water softeners, installed at a colliery in Cumberland, where the water is pumped from the mine and heated by exhaust steam in its passage from the plant, is shown in Fig. 4. In some types of the Harris-Anderson apparatus, where the chief function required is the elimination of oil from the water before it passes to the boiler, the lime saturator is done away with and two solutioners are affixed, one for soda and the other for alum. The bulk of the water passes directly to the treatment tank, while fractional portions are carried by the distributor to solutioners in which the cages are filled respectively with the two reagents. The action of the alum solution is to coagulate the oil. All the water passes to a filter of the usual type which is frequently divided into two independent sections so that one can be cleaned while the other remains in action.

Experiments made in England with calcium chloride as an agent for laying dust in coal mines have shown that a 40- to 50-deg. solution used at the rate of 8 gal. for every 30 ft. will lay dust 3 in. thick and the zone so treated will be safe for a period of 3 months. A roadway cleared of dust for 225 ft. and then treated with 90 gal. of calcium chloride solution was found to remain moist 4 months; 330 lb. of finely ground solid calcium chloride on 250 ft. of roadway was effective for 6 to 8 weeks.

Shields for Acetylene Lamps

By JOSEPH DANIELS*

During a recent trip through the mines of the Roslyn district in Washington, I noticed a device which some of the men had adopted to protect the flames of their acetylene lamps. In exceptionally windy or blowy places, the reflectors ordinarily furnished with the lamps did not afford sufficient protection for the flame, particularly in the cases of trip riders and locomotive men. The scheme which they had adopted here consisted in removing the usual reflector from the lamp and substituting for it the screw top of the extra bottom which is furnished with the Baldwin lamps. By simply perforating this top at the center it was found possible to slip it over the lamp tip and secure it as indicated in the illustration.



SHIELDS FOR THE FLAME OF ACETYLENE LAMP

In some places, the men had looked elsewhere for their lamp shields, and found that the brass bases which cap the usual incandescent light bulb, when emptied of their packing and perforated at the top, could be used to advantage. This arrangement is likewise pictured in the illustration. Both forms of shield can be removed easily, when not required.

While the light obtained with the use of these shields is not nearly so good as that from a lamp with the ordinary reflector, there is derived the undoubted advantage of having a steady light under varying conditions of draft, which makes this arrangement at times extremely useful to the men under ground. I also noted in the mine referred to that a number of men used these flame protectors at the working faces, apparently with good results. While it is not suggested, that this device should be used except under the conditions referred to, the idea may prove of value or convenience to some who have to contend with like circumstances.

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Coal Production in Africa

With the increasing development of the "Dark Continent" by railways, and the continued opening out of new mining districts to further the production of its wonderful natural treasures, the coal question becomes more and more important.

The proper solution of the problem of coal supply is much more urgent even than that of labor supply, which is so much discussed everywhere on the continent. Up to date there is only one district in Africa which has been shown to be rich in coal—Natal, where there appears to be hundreds of millions of tons. From this supply the Rand mines near Johannesburg draw what they require; and the merchant marine and the navy take coal at Durban. Not so fortunate are the other African mining regions, as for instance German Southwest Africa,

where new copper lodes have recently been opened out. These mines lie near the coast; but for all that, freight rates are exceedingly high.

The inland districts, for instance the much discussed copper mines of Katanga in Belgian Congo, lie in the heart of Africa and their product must be carried by rail at least 1100 miles before it reaches the coast. The production of copper on an economical scale would be impossible if coal had to be freighted all that distance to the mines. Three hundred miles from Katanga lie the Wankie coal beds. If these can not deliver enough coal, and other strata are not opened out, the favorable development of the Katanga district will be out of the question, in spite of its great copper deposits.

This example shows plainly the importance of the coal question in central Africa. Without doubt Central Africa—North Rhodesia, Katanga, and the Tanganyika-Nyassa districts—has rich ore deposits. But the hopes now based thereon will disappear if sufficient coal is not discovered.

The Election of Mine Inspectors

By J. T. Beard

Since the enactment of the law in Pennsylvania, in 1901, requiring that all anthracite state mine inspectors be elected by popular vote of the people in the several inspection districts specified in the law, the results have been closely watched by mining men in the principal mining districts throughout the United States and Canada.

Inasmuch as frequent inquiries are made by states facing a similar crisis, asking what success has attended the inauguration of this system in Pennsylvania; and in view of the fact that the enactment has never met with the approval of the state Department of Mines or the mine inspectors themselves; and since, at different times, efforts have been made, though unsuccessfully, to have the act repealed, and these efforts will be repeated at the meeting of the next legislature, it is of interest to review briefly the conditions that were responsible for the enactment and summarize some of the effects of the law.

It was the memorable Avondale disaster, Sept. 6, 1869, that shocked Pennsylvania and aroused her legislators to a realization of the immediate necessity for an adequate mining law. This resulted in the enactment of the law known as the "Ventilation Act," which, though far from being perfect, went a long way toward improving conditions and safeguarding the work of mining, by requiring the adequate ventilation of mines and providing for at least two separate openings to every mine and a thorough system of mine inspection.

EFFECT OF FIRST PENNSYLVANIA MINING LAW

There is no doubt in the minds of practical mining men of every type that the enactment of this first mining law in Pennsylvania, in 1870, which was, also, the first adequate law regulating coal mining in the United States, resulted in a vast improvement in mining conditions throughout the state. This is clearly evidenced by even a cursory glance at the tabulated statistics, as published in the anthracite report of the Department of Mines, 1910, p. 62. The table there given shows the number of employees, total tonnage, fatal accidents and death rate, for each year from 1870 to 1910, inclusive. We reproduce here, for handy reference, the same data for each fifth year during this period, and the corresponding averages for each five years, in this time.

The greatest apparent benefit derived from the mining law of 1870 is shown in the rapid decrease in the death rate and the large increase in the tonnage, in the first five-year period following the

Conditions and causes that led to the enactment of the first coal-mining law in the United States. Improvement in mining shown by increased tonnage and decreased death rate in anthracite mines in Pennsylvania. Certification of mine foremen. Law creating miners' examining board and the certification of miners in anthracite mines. The anthracite mine inspectors' election law. Effect on mine inspectors, examining boards for mine foremen. How the law affects miners. The repeal of this law urgent.

enactment, 1870-4, inclusive. During this period, the number of employees increased 96.5 per cent., and the production of coal 65.2 per cent. Both of these factors would naturally increase the chances of accident over 100 per cent.; but, owing to the improved conditions under the new law, the number of fatalities increased from 211 to 238, only 12.8 per cent., while the death rate per million tons of coal produced decreased from 14.85 to 10.17, or 31.5 per cent. A similar improvement, though naturally less pronounced, continued during the second five-year period, 1875-9, inclusive, when the number of employees increased 48.7 per cent. and the tonnage 19.5 per cent., while the number of fatal accidents fell to 202, in 1880, a decrease of 15.1 per cent., and the death rate for that year

was only 7.22 per million tons of coal produced, decreasing 29.1 per cent., in this period.

The third five-year period, 1880-4, inclusive, fails to show the same marked improvement in mine management. The reasons for this, though to an extent problematical, are to be attributed largely to a growing indifference to the mine law, which had, now been in force 10 years, and an ever-increasing demand for coal and decrease of intelligent miners and mine bosses. This latter condition forced the alternative of employing a greater and greater proportion of foreign labor in the mines and increased the dangers of operation. During this period the mine employees and tonnage increased 36.7 per cent., while the fatalities rose to 332, in 1885, an increase of 64.4 per cent., and the death rate per million tons for that year became 8.68, increasing 20.2 per cent.

FIVE-YEAR AVERAGES, 1870-1910

It is evident that any unusual occurrences, such as variable market conditions affecting the number of days the mines worked in the year; strikes or other labor conditions; mine explosions, etc., might materially modify the results for any year, as given in the first section of the above table. For this reason, the five-year averages, shown in the second portion of the table, are perhaps more representative of existing conditions. The same general increase in number of employees and tonnage per year is shown by these average figures, for the three five-year periods, 1870-1884, inclusive. The average death rate per million tons,

TABLE SHOWING NUMBER OF EMPLOYEES, TONNAGE, NUMBER OF FATAL ACCIDENTS AND DEATH RATE, FOR EACH FIFTH YEAR, 1870-1910, INCLUSIVE. ALSO, AVERAGE OF THE SAME DATA FOR EACH 5-YEAR PERIOD, IN THE SAME TIME, AND THE PERCENTAGES OF INCREASE IN EMPLOYEES AND TONNAGE

Year	Employees	Production in Tons (2000 Lb.)	Number Fatal Accidents	DEATH RATE	
				Per Million Tons	Per 1000 Men
1870	35,600	14,172,004	211	14.89	5.93
1875	69,966	23,402,646	238	10.17	3.40
1880	73,373	27,974,532	202	7.22	2.75
1885	100,324	38,232,155	332	8.68	3.31
1890	119,919	44,986,286	378	8.40	3.15
1895	143,705	56,948,756	421	7.39	2.93
1900	143,824	57,363,396	411	7.16	2.86
1905	168,254	78,647,020	644	8.19	3.83
1910	168,175	83,683,994	601	7.18	3.57

Period	FIVE-YEAR AVERAGES					Percentage Increase	
	Employees	Production	Fatal Accidents	Per Million Tons	Per 1000 Men	Em- ployees	Output
1870-4	43,987	17,240,762	228	13.38	5.26	96.5	65.2
1875-9	68,019	24,701,618	222	9.03	3.25	48.7	19.5
1880-4	84,820	34,290,125	284	8.23	3.34	36.7	36.7
1885-9	110,413	41,925,038	338	8.05	3.06	19.5	17.7
1890-4	130,307	49,944,523	425	8.51	3.26	17.7	26.7
1895-9	145,275	55,340,810	444	8.03	3.09	0.1	0.7
1900-4	150,554	62,925,186	467	7.41	3.09	17.0	37.2
1905-9	169,780	80,122,004	631	7.87	3.71	0.0	6.4

for the third period, 1880-4, however, shows a decrease instead of increase, pointing to the greater frequency of fatalities toward the close of this period.

ENACTMENT OF LAW REQUIRING CERTIFIED MINE FOREMEN, 1885

A growing need was felt at this time for greater competency on the part of the average mine foreman. In the same manner as the Hartley disaster, England (1862), and the Avondale, Penn. (1869), caused a reaction in favor of more adequate mining laws, so the conditions in Pennsylvania, at this time, gave rise to a popular demand for a law requiring the certification of mine foremen, which requirement became law in Pennsylvania, in 1885.

CREATION OF THE MINERS' EXAMINING BOARD, 1889

In 1889, the anthracite mines were further safeguarded by the enactment of a state law creating a Miners' Examining Board in each inspection district, and prohibiting the employment as a miner, in any anthracite mine in Pennsylvania, of any person not holding the certificate of the board. This law, like that providing for the examination of mine foremen, was calculated to raise the standard of intelligence among miners; and but for the reckless disregard of the law and the dishonesty of examining boards in granting certificates to incompetent persons, conditions in the mine would have been greatly improved. Owing to the reasons just stated, however, the benefit derived from the enactment of this law was not as great as the framers of the law had a right to expect.

PROMINENT FEATURES OF MINE LAW

By the foregoing brief review, I have endeavored to draw attention to the importance of mining legislation, by calling to mind a few of the main features of the Pennsylvania anthracite law that have or should have operated to increase the safety and economy of mining in anthracite mines. It is an old saying that "Figures do not lie"; and when carefully tabulated statistics, such as those published in the annual reports of the Department of Mines, in Pennsylvania, are studied and rightly interpreted, they cannot fail to show the importance of effective mining laws.

Without going into minute details of the numerous rules and regulations intended to safeguard and control minor points in the operation of mines, I have referred to such leading features of mine law as ventilation, inspection, examination and certification of mine foremen and miners. These, each and all, have been the means of establishing a comparatively high degree of safety in the mining of anthracite coal in Pennsylvania.

THE ANTHRACITE MINE INSPECTORS' ELECTION LAW, 1901

There is another feature of the anthracite law, enacted in 1901, that has operated quietly to undermine and destroy, during the past decade, all that the law had previously accomplished. This enactment is the law requiring the election of the anthracite mine inspectors by popular vote of the people. The law has well been described as pernicious, seductive and destructive, as opposed to all that is wholesome, ingenuous and constructive. In his annual report for the year 1903, James E. Roderick, chief of the Department of Mines, in Pennsylvania, refers to this law as the work of "a few interested persons" who succeeded in inducing the anthracite miners, assembled in convention, to pass a resolution calling upon the legislature to amend the mining law so as to provide for the election of the anthracite mine inspectors by the people.

The reason given for this demand was that it would place in the hands of the voters, in each district, the choice of the inspector for that district and remove all cause of complaint growing out of the appointment of an inspector who might prove objectionable to the miners of the district. The reasoning was seductive; it was seemingly a just and fair proposition to allow the people to choose, by direct vote, their own inspector. Thinking men, however, saw the inevitable result of granting this demand voiced by a few men whose judgment was temporarily blinded by the rehearsal of some supposed wrongs ascribed to an alleged objectionable inspector. The sequel has proved the unwisdom of the law, and today the demand among intelligent people for its repeal is even more urgent than that for its passage ten years ago.

EFFECT OF THE LAW ON MINE INSPECTORS

The mine-inspection service of the state is a thankless service. The men charged with its duties are officers of the law, whose business it is to enforce its provisions. To transgressors and violators of law, these men are often "objectionable." To place the choice of the inspector in the control of the voters of a district where the votes are practically dictated by a few men who desire to be unmolested and to make their own interpretation of the laws to suit their individual cases, would be to surrender the law to its violators.

What is law, when the officer charged with its execution is helpless in the hands of would-be violators of law? What is mine inspection when the inspector must close his eyes as he goes through the mines and seal his mouth when he comes to the surface? But this is the logical result and what must be expected under the anthracite mine inspectors'

election law. The inspector becomes the servant of the officials of the mines he inspects, instead of the servant of the people and an officer of the law.

On the inspector's side, the effect of this law is no less baneful. His conscience is stultified, his dignity degraded and his usefulness to the state forfeited. In some instances the inspector, in the anthracite region, has proved a mere figure head. It is true he has collected some valuable statistics of mining and drawn his salary. In other instances he has even made suggestions, some of which may have been carried out. Few indeed are the cases where there has been any serious contention on the inspector's part, who has generally refrained from making suggestions that would be at variance with the company's wishes.

EFFECT OF THE LAW ON EXAMINING BOARDS

One of the most harmful effects of the mine inspectors' election law is the influence exerted by the other members of the examining board for mine foremen to force the inspector into line, in reference to the desired recommendation of a candidate whose examination before the board has shown him to be wholly incompetent to hold the position of mine foreman, but whose political influence, backed by the expressed wishes of his company, demands recognition by the board. The mine inspector is an *ex-officio* member of the board of examiners for mine foremen, the other members of the board being two miners and one mine operator, superintendent or owner. The inspector is generally in a position better qualified to judge of the competency and fitness of a candidate to fill the position of mine foreman than any of the other members of the board. In most cases, however, he is compelled to set aside his own convictions and join with the rest in recommending the candidate and signing his certificate of competency. The refusal to do this would probably jeopardize his chances in the next election, and no one realizes this better than the inspector himself.

EFFECT OF THE LAW ON MINERS

Instead of this law working to the advantage of miners, as they had been led to believe it would, by placing in the hands of each miner a vote for the man of his choice, it has operated much to their disadvantage. In many instances the miner's vote is not his own but is cast in compliance with the dictation of bosses, which limits his choice of inspector to their selection of the man for whom he must vote.

The working of the law with respect to examining boards for mine foremen has proved a menace to the safety of mines, by the certification of many in-

competent men for that position, by reason of which the lives of miners have been endangered.

The same law has also proved a hindrance to many ambitious, deserving miners who have studied to fit themselves for foremen and assistant foremen. Their knowledge of theoretical and practical mining will, in many cases, surpass that of the man who secures his certificate by other means than proving his competency in examination. Too often the worthy and competent miner is pushed aside by one whose only hope is through the employment of dishonest means to secure the necessary certificate.

REPEAL THE MINE INSPECTORS' ELECTION LAW

There is probably no law on the statute books of Pennsylvania, the repeal of which is more urgently demanded by intelligent mining men of all classes, from the miner who advocated the law, to the mine inspector who has most keenly felt its burden. Let the miners, who are responsible for the enactment of this election law, do their part to wipe it off the books, recognizing what is a fact, that it is a disgrace to honest mining, the work of grafters and wire pullers, and sub-serves no good purpose but rather is a menace to life and property and a hindrance to the merited advancement of ambitious and competent miners.

APPOINTMENT OF MINE INSPECTORS

Throughout the bituminous districts of Pennsylvania, as in almost every mining state, the appointment of mine inspectors is general. In most cases, the governor is clothed with the appointing power and the term of office varies from two to four years. I have suggested, at different times, the feasibility of the delegation of the appointment of mine inspectors to the judges of the district courts in the respective inspection districts who should also properly appoint the boards of examiners for mine inspectors, and base their selection of mine inspectors on the reports of the examining boards. The appointment of both the examining boards and the mine inspectors should be, confessedly, as far removed from politics and the influence of wire pullers as it is possible to have them.

The work of mine inspection is a most important work. It is and should be a subsidiary part of the state government and subject to its control, as far as its work is concerned. Owing, however, to the peculiar relations that the inspector must bear to the mine operator and miner, as custodian of the mine law, his position should only be assailable through the courts, by process of law.

There are strong reasons why the appointment of mine inspectors should be for a long period of years, say, 20 or 30 years, or good behavior with a time limit.

One of the most important of these reasons is the fact that a good inspector becomes more efficient and valuable each year. His growing familiarity with the mines and district in his charge and his knowledge of local conditions and requirements make his service more effective each succeeding year. He knows each mine as a mother knows her child. He understands better the whims and habits of both operators and men as time improves his acquaintance. A short term of office and the frequent change of inspectors is both troublesome and costly. Owing to the lack of a full appreciation of conditions, and in part, to the desire of a new man to do something worth while and to make his presence felt, changes in the mine work or equipment are often urged that a longer acquaintance with the mine would show unnecessary and perhaps even harmful. The need of longer term appointments is more urgent in mine-inspection work than in any other calling, owing to the expense and danger incurred by ill advised changes in methods or equipment, in and about mines.

A careful consideration of these and other facts, in the same connection, should impress any thinking man with the inadvisability of the mine inspectors' election law. But, in closing, I would ask, if such an election law is necessary or advisable in the anthracite district of Pennsylvania, why is it not likewise advisable to enact such a law for the bituminous districts? What difference of conditions or requirements exists between these two districts, in the same state, that the anthracite inspectors must work for their reelection at the polls, while the bituminous men are reappointed on their record. Much valuable time is lost to the state and the work of the inspector hampered when he is forced into politics and must exert himself for weeks in the endeavor to secure his reelection at the polls.

Some Drafting Accessories

The following notes, from the *American Machinist*, will doubtless prove of interest to the members of engineering profession among the COAL AGE readers:

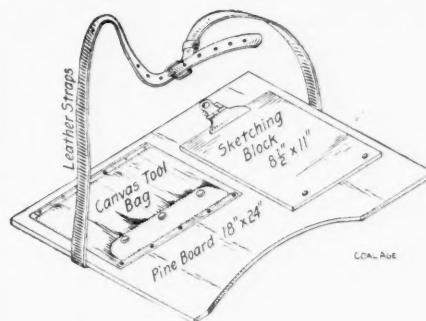
A CONVENIENT SKETCHING DEVICE

The accompanying diagram illustrates a convenient sketching device. It consists of a small drawing board about 18x24 in. It is intended that when the board is in use it will be hung from the shoulders of the draftsman. For this purpose leather shoulder straps are attached on each side at a point a little beyond the center. When the device is not in use it may be allowed to hang vertically from the shoulders and the user is but little inconvenienced in moving or climbing about. The straps are adjustable as to length. The side of the board nearest the user is cut away slightly to conform to the natural form of the body.

The board is provided on the right with a sketching block or pad, which is

securely held by means of a spring clip. Two small pegs at the lower end fit into corresponding holes in the block to prevent it from slipping about. It is intended that the sketches when completed may be removed from the block and inserted in a loose-leaf book cover.

On the left side the board is provided with a canvas tool bag which is fastened to the board by means of thin metal strips at each end. The canvas flap may be fastened down by means of straps and buckles or snap fasteners as desired. The bag is divided into compartments in which the draftsman may keep his instruments.



SKETCH BOARD AND RESERVOIR PEN

When taking measurements the board may be laid to one side if necessary in order that the draftsman may move freely about. A sheet of celluloid may be kept under the hand to protect the sketch from dust and grease.

ANOTHER RESERVOIR PEN

I have been using a reservoir pen for five or six years; I think it better than any other type I have ever seen described. The pen I refer to has the advantage of being equally useful for writing or india-ink work. The flow of ink to the point can be regulated by sliding the coil up or down on the penpoint. While the coil can be made of steel music wire for india ink, I made mine of silvered banjo strings, so as to use them with any kind of ink. The penpoint can be removed by sliding the coil up out of the way.

To Determine Pillar Thickness

The following rule has been suggested for determining the thickness of pillar necessary to avoid squeezes, and protect an entry from the first room in the panel: Take 1 per cent. of the depth of the seam in feet, add five and multiply this sum by thickness of seam and you will have the necessary pillar thickness.

The Pit Boss

The pit-boss stood at the Pearly Gate
His face looked worn and old,
He meekly asked the man of fate
For admission to the fold.

"What have you done," asked Peter kind,
To seek admission here?"
"Oh, I used to boss a coal mine
On earth for twenty year."

The gate swung open sharp
As Peter touched the bell.
"Come in, my lad, and take your harp
You've had enough of Hell."

—William Harkes, in "Fuel."

Double Tipple for Colonial Coal Co.

By W. T. Griffith *

Conditions which attended the development of the Colonial Coal & Coke Co.'s property, near Prestonsburg, Ky., were met by the construction of a double tipple, which embodies several interesting features. The tipple and also the local power plant are here described.

*Civil and mining engineer, Pikeville, Ky.

While the property controlled by the Colonial Coal & Coke Co., near Prestonsburg, Ky., lies adjacent to the railroad and the Big Sandy River, its frontage is a bluff 30 to 60 ft. high, except for a small steep drain known as Kelse Hollow, which empties into the river near the middle of the track; and it is in this hollow that the tipple and power plant are located. The seam of coal that is here being worked lies at tipple height above the railroad. Two mines have been opened, one on each side of the hollow, and tracks from each opening run to the tipple, which is located midway between them.

TWO-INCH BAR SCREENS

After the introduction of machine mining in this locality, it was found that the native miners, being used to shooting from the solid, persisted in using as much powder after the coal had been undercut as they had previously been accustomed to employ, with the result that an excessive amount of slack coal was produced. On this account, the tipple was provided with 2-in. bar screens, and the miners are now paid on the basis of the amount of coal which

It was necessary to be able at any time to change quickly from making slack coal to loading run-of-mine, or vice versa. This was accomplished by building a double tipple, the south side of which is for screened coal and the north side for run-of-mine. On the tipple floor, Fig. 1, the tracks are so arranged that, by throwing two levers, four switches are operated which effect the necessary changes in the movement of the cars from the two openings. Thus, if it is desired to load screened coal, the switches A and A₂ are left open for a straight run to the screen dump, while

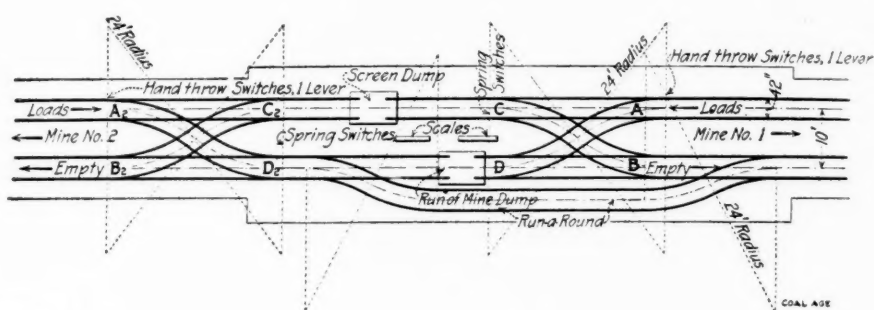


FIG. 1. TRACK PLAN, SHOWING TWO DUMPS AND ARRANGEMENT OF SWITCHES

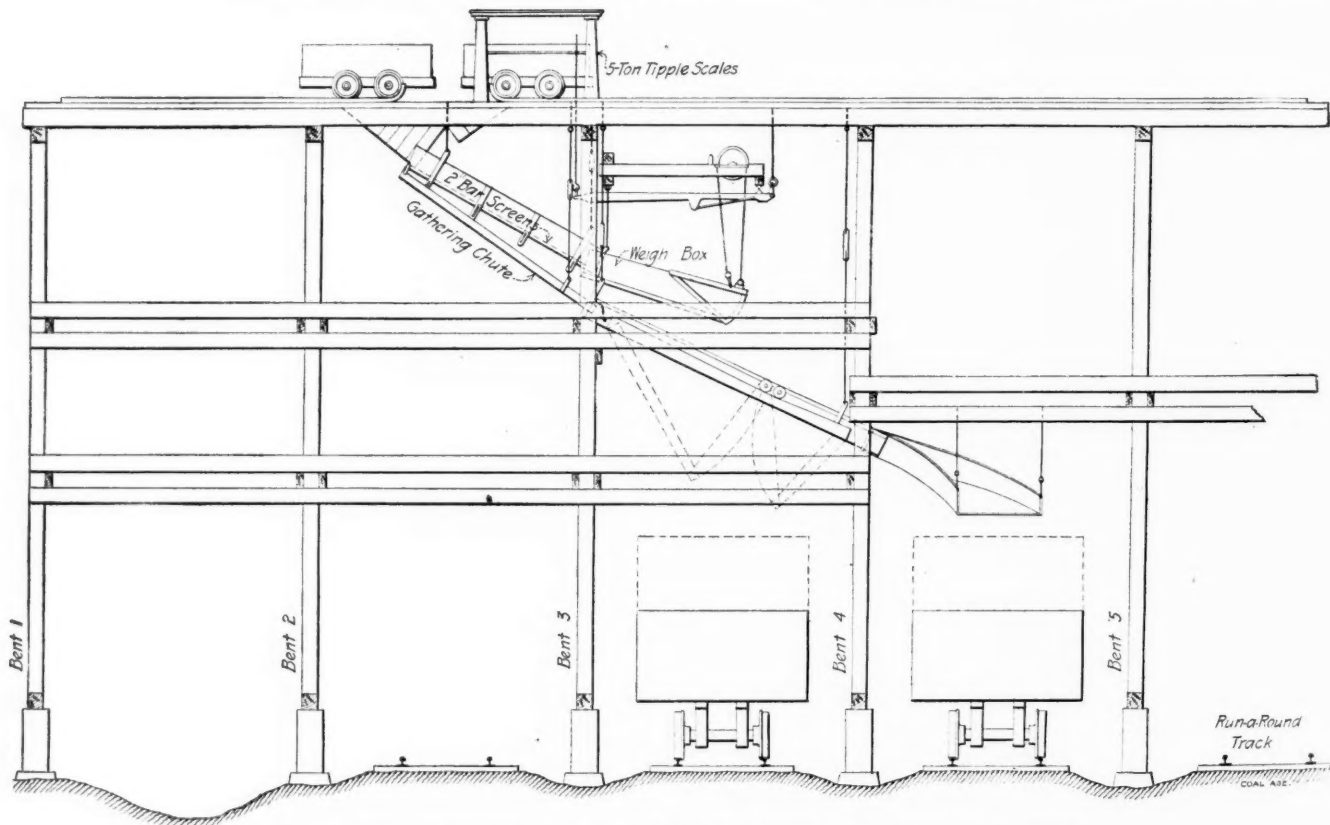


FIG. 2. SIDE ELEVATION, SHOWING MINE-RUN DUMP AND LOADING CHUTES

passes over these bars. That the introduction of the 2-in. bar screen has had the desired effect, is shown by the fact that, whereas, formerly 30 per cent. of four-inch lump was exceptional, now

40 to 50 per cent. of four-inch lump and 20 to 25 per cent. of egg are commonly obtained.

In designing the tipple for this operation, another difficulty had to be solved.

the switches B and B₂ are closed to provide a free passage for the empties to the empty track. If run-of-mine coal is to be loaded the position of these switches is reversed.

The switches C and C₂, also D and D₂, are held in place by springs to give a free run to the empty cars. They are pushed open by the wheel flanges as the loads pass through and always stand in the same position whichever side of the tippie is being used. In order that motors and machines may be taken from one mine to the other, a run-around track is provided at one side of the tippie.

LOADING FACILITIES

While making screened coal, it often happens that a rush order for a car of run-of-mine comes when the lump track is blocked with a partly loaded car, although the egg-coal track can be cleared at once. In order that either track may be used in a case of this kind, a drop-bottom has been provided in the run-of-mine chute, which, on being opened, allows the coal to pass into a car on the egg-coal track, and when

passing over the bars, after being weighed, is dropped onto the middle of the same shaker. The upper shaking screen is 5½ ft. wide, and the lower shaker is 6 ft. wide, there being a 3-in. drop from one to the other. The screen plates of both are made in sections 4 ft. long and are easily removed and changed. Two sets are provided for each shaker, so that any of the combinations shown in Fig. 3 may be made.

The bottom of the bin or hopper under the egg-coal screen, is pitched in the direction of the loading track, and constitutes a lip screen, with ¾- by 1½-in. slotted openings, so that small coal, caused by breakage in traveling through the screens is taken out and sent to the slack car by a screw conveyer.

Since the tippie was designed the railroad company has increased the height of some of its cars. In order to clear the brake wheels of these, a drop basket, which was built for the lump

chinery, including shakers and chutes was furnished by the Stevens-Adamson Manufacturing Co. from my designs.

THE POWER PLAN

The power house at this mine is equipped with a single 150-hp. Kingsford Scotch-marine-type boiler, and a 100 kw. Curtiss-turbine generator set. Provision has been made for installing two more boilers and additional generators as future development may require them. The water supply for this plant is taken from the Big Sandy River by a deep well pump, having a capacity of 100 gal. per min., and is pumped to a reservoir on the hillside 140 ft. above the railroad. There is thus furnished a much larger amount of water than will ever be needed for power purposes, the idea being, however, to secure adequate fire protection as well. As an auxiliary supply, a small dam was built across the hollow, and if neces-

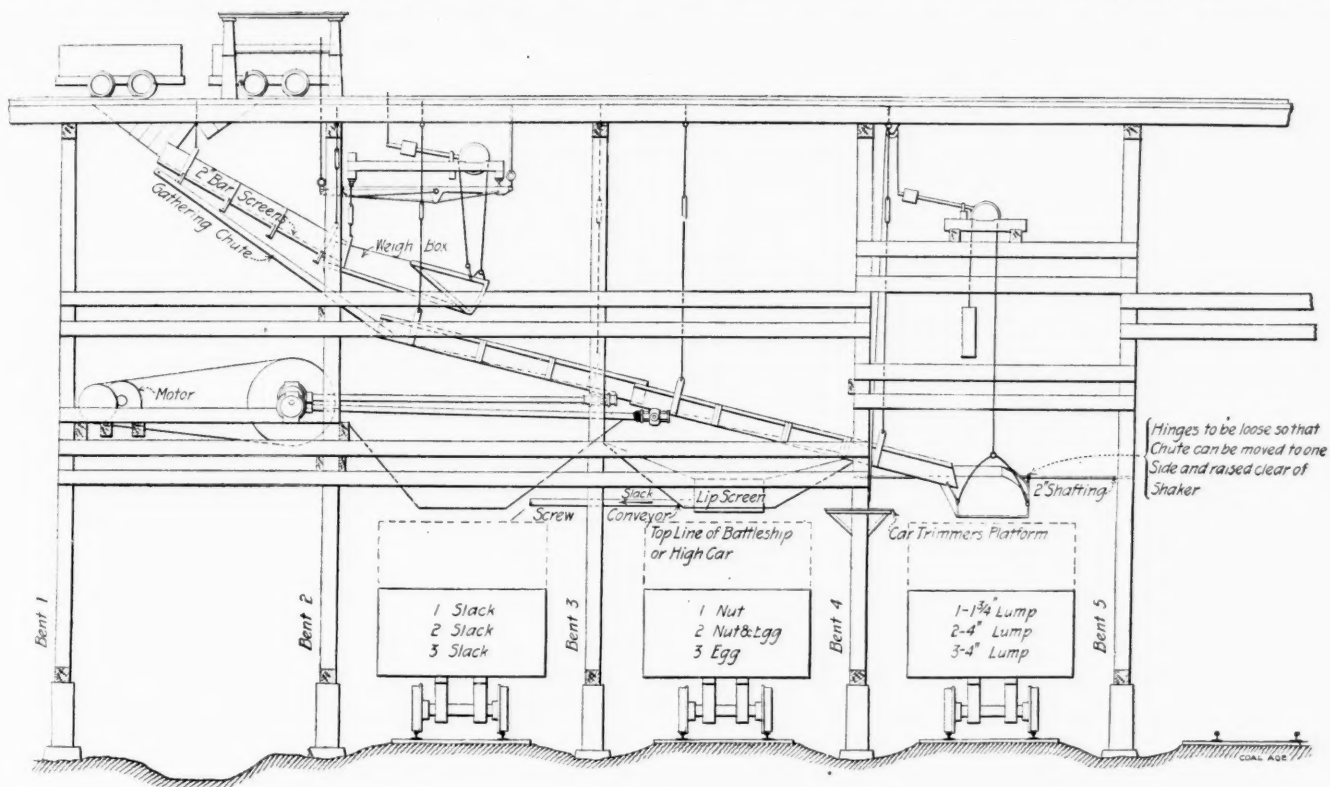


FIG. 3. SIDE ELEVATION, SHOWING SCREENED-COAL PORTION OF TIPPLE

closed carries it over to a car on the lump track.

In loading run-of-mine, coal from the pit cars is dumped onto the 2-in. bar screens, and the fine material that goes through is taken by a gathering pan to the main loading chute, while the coal that passes over the bars runs into the weigh box, and after being weighed, is dumped into the main chute.

On the screened coal side of the tippie, is another set of bar screens, and a gathering chute. The fine coal passing through the bars goes to the upper end of the slack and nut shaker, while that

track, has been set aside and a swinging chute substituted. This is hinged loosely on a piece of 2-in. shafting, and by slipping it along the shaft, to clear the shaker, it can be raised by the counter weight to pass the brake wheels, after which it is returned to place, the whole operation taking about two minutes.

The shaking screens have a 9-in. throw, and are run at 100 r.p.m. These, together with the screw conveyer are driven by a 25 hp. General Electric motor. With the exception of the screw conveyer and the bar screens, all the ma-

sary, the boilers can be supplied from this source by a steam injector.

One of the largest producer gas units in the world is located at the Berchenwood colliery, Kildgrove, England. The plant is equivalent to 32,000 hp., gasifies 320 tons of fuel per 24 hours and comprises 13 special Mond producers fitted with arrangements for the mechanical removal of ash. Waste shale, low grade coking coal, bituminous slack, washery refuse and belt pickings are used for gas production.

Expropriation of British Mines

SPECIAL CORRESPONDENCE

The British government, by accepting the principle of a minimum wage scale and incorporating it into an act of Parliament, has taken a definite step toward the expropriation of the coal mines of the United Kingdom. The strike of the British miners has clearly and abundantly demonstrated that the integrity of the empire politically and socially lies within the power of a million of mine workers. There is no exaggeration in this statement. The realization of that fact came home to every man, woman and child in Great Britain and Ireland during the past five or six weeks, to some with actual suffering and to others with a haunting apprehension of suffering to come.

It seems to me as I interpret the future by the light which this historical labor revolt and its consequences affords, that another strike on a similar scale would be fatal to the industrial, financial and international supremacy of England. A repetition of such a strike she must obviate at all cost. How can she do it? In my opinion, there is only one way in which it may be done, and that is by expropriating the coal mines of England, Scotland and Wales. But it will be said that such a measure is an acknowledgment of the necessity for the adoption of socialistic principles. Not at all. But even if it is, in my judgment, the fact and its consequences must be accepted to avoid a greater evil, if the power of the British miner to injure the empire does indeed constitute an evil. Englishmen are not afraid to face the logic of realities. If it is necessary, or if they deem it necessary, they, without the slightest hesitation, will expropriate the mines rather than face the alternative of industrial anarchy and national distress.

The Tory or Conservative press of Great Britain is today demanding whether forty-two millions of people must be at the mercy of one million men who happen to be engaged in an essential industry. The British Tory press declares that the Liberal government has raised a Frankenstein which it cannot conjure. Of course, this is more or less party politics; but it expresses a truth which cannot be gainsaid. As matters stand, forty-two millions of people are absolutely at the mercy of one million of mine workers. The acceptance of a minimum wage scale as a national economic principle has not altered the situation; it has only to a certain extent modified it. Neither the British miners nor the British operators seem to be satisfied with the establishment of district boards as regulators of the minimum wage scheme.

The miners have realized their omnipotence, and what they accomplished yesterday with such ease they can accomplish tomorrow for some other purpose.

Great Britain has to maintain an enormous fleet of battleships, not to speak of a stupendous mercantile marine. The one is complementary to the other. Without the mercantile marine, Great Britain would have little or no need of her enormous fleet. She must maintain both at the height of their efficiency. She cannot do this without coal. It may be accepted as established that for England, at least, local strikes are bygone incidents, and that for the future under the auspices of the Miners' Federation all strikes in the coal fields of Great Britain will be national in extent and a unit in intensity. I am satisfied that before a British government, no matter which party is in power, permits another strike on the scale of that which has just lately closed, it will come out plainly and squarely for the expropriation of the mines, and that in doing so it will have behind it the solid and enthusiastic support of the people of the country. I do not think that that consummation is very far off. There is nothing really new in this proposition.

Twenty years ago the Irish landlords were as firmly entrenched in the possession of their estates as the colliery proprietors are today in the possession of their mines. The social and economic upheaval which ended with the expropriation of the hereditary possessions of the Irish country gentry with adequate compensation, meant as much to them, and to their country and no more than a change in ownership of the mines of Great Britain will involve to the operators and people of the British Isles. Of course, national transformations of this kind do not take place in a day. It takes all the statemanship, all the financial genius of a nation to effect these things without suffering even more revolutionary upheavals. But the industrial situation in Great Britain is inevitably heading that way.

A general strike is more devastating and disconcerting financially than a war, even a civil war. In war the arteries of national commerce remain open, and often are more active than they were before, or are in the succeeding years. The national life is not totally paralyzed, as it often is in a general strike among miners or railroad employees.

But it may be asked whether the nationalization of the mines or the railroad would prevent general strikes. This is a question into which it is impossible for me to enter here. A national strike in a national industry is simply rebellion, and rebellion is so contrary to social unity that it is but rarely found in any country and it seems unlikely that the British workman would favor it.

Using Ontario's Peat Bogs

It is announced by the Mines Department of the Canadian government that the associated manufacturers at Brantford, Ont., have become so convinced that the air-dried peat method employed by the mines branch can be made a commercial success that, according to U. S. Consul H. A. Conant, they have contracted with the government to continue the work at Alfred, Ont., and will spend over \$50,000 of private capital in trying to improve peat machines. This action was decided on only after a thorough investigation. The machine to be used will have a capacity of 60 to 80 tons per day, as compared with the 30 tons the government turned out.

The government experimental plant at Alfred exhibited samples of machinery and of peat ready for market at the Ottawa fair. A thousand tons of peat were made up, which was sold at \$3.25 a ton. It burns to a fine ash, there being practically no residue, and is much cheaper than coal.

The results of the Dominion government's experiments in the production of fuel from the peat bogs in Alfred Township, Prescott County, have been so successful that the Canadian Pacific Ry. has opened negotiations with the government for the purchase of these bogs. Should the railway company secure the property, it is understood that the output of prepared peat will be greatly increased.

There are vast bogs in many parts of Ontario, and success in the present instance will be apt to start operations in many places, the more so, because of the scarcity of wood and the high cost of coal.

Distinguished German Visitors

A small committee, consisting of directors of the German Museum in Munich, holding high offices in their country, has come to the United States. The visitors are His Excellency Count Podewils, late Prime Minister of Bavaria, Dr. von Borscht, Lord Mayor of Munich, and Dr. von Miller, Councillor of the State.

The mission of this committee is to bring the German Museum into closer touch with institutions in the United States, devoted to the history of technical science. Having only a limited time at their command, its members would naturally like such Americans as sympathize with their mission to come forward, with a view to facilitating an early communication.

COAL AGE therefore suggests that any of our readers who are able to give information, or wish to communicate with the committee, send their addresses to this paper, to be passed on to the German visitors as soon as possible.

Current Coal Literature

The Best Thought Culled from Contemporary Technical Journals, Domestic and Foreign

Anchoring New Bolts in Old Foundation

It is sometimes necessary to change an old foundation to accommodate a new arrangement of equipment, when, for instance, low- and high-pressure steam cylinders are compounded to increase the power of an engine. Whenever it is necessary to set an anchor bolt in an old foundation, the difficulty may be met in one of two ways, says R. B. Dale in *Power*.

In the first method a hole is drilled in the concrete slightly larger in diameter than the bolt to be used and to the

proper depth. A bolt is then prepared by cutting a slot in one end lengthwise of the bolt and about 6 or 8 in. long. This slot is then fitted with a wedge of hardened steel held in place by a pin of copper or other soft metal. The bolt is lowered into the hole and struck several hard blows on the upper end with a heavy hammer. This shears the soft metal pin and drives the wedge into the slot, thus enlarging the diameter of the bolt at the lower end. The bolt is then grouted into the hole and the nut is tightened to complete the work.

In the second method a hole is drilled for the bolt as before. A second hole

is then drilled laterally through the side of the masonry to meet the first hole and this is enlarged sufficiently to take the standard anchor plate. The work is completed in the customary manner, precautions being taken to grout the anchor plate to a firm bearing in the old concrete. The first method is cheap and simple, although there is no certainty as to what happens in the bottom of the hole. The second method, while more troublesome and expensive, is the more reliable and should be used on the more important work. It gives the bolt almost as secure a hold as if the foundation had been built around it.

China as a Coal Producer

By Thomas T. Read

Coal is easily the first of the mineral resources of China, both in the extent of its deposits and in its development. A conservative estimate of the present production is 15,000,000 tons annually. The casual visitor to North China, where the winter climate is rigorous, seeing the children of the villages, armed with rake and basket, engaged in collecting every scrap of vegetable material that can be utilized as fuel, is likely to wonder why coal is not more generally used. The reason is not hard to understand: in many regions the low cost of labor, the high cost of transportation, and the low scale of living put coal beyond the reach of the people. It is probably safe to estimate that one-half the cost of the food of an ordinary workman is chargeable to the fuel used

The coalfields of China are largely in the interior and consequently but little opportunity exists for transportation of the product. Nowhere are opportunities for mining more favorable and nowhere are they more neglected. Probably as much coal exists in China as in the United States. Sulphur is usually in low percentage, but the phosphorus content is sometimes excessively high.

*Formerly professor of metallurgy, Imperial Pei-Yang University, Tientsin, China.

Note—Read at San Francisco meeting of the American Institute of Mining Engineers, October, 1911.

in cooking it, and where the otherwise unemployed children can be sent out to gather grass and pull up the roots of the larger cereals, such as corn and *kao-liang*, there is little market for coal, except for industrial purposes. Near the mines, where coal is abundant and cheap, it is freely employed. The development of railroads, steamships and industrial plants will not only create a greater market for coal, *per se*, but, by raising the scale of living through the higher wages paid for labor, will increase the consumption of coal for household purposes. The annual consumption of coal in the United States is approximately 3.5 tons per capita per annum; the consumption in China figures roughly only one-twenty-fifth of a ton. An approximate estimate of the present coal-production in China is given in Table I.



FIG. 1. COKE OVENS AT P'ING-HSIANG COLLIERY, KIANGSI

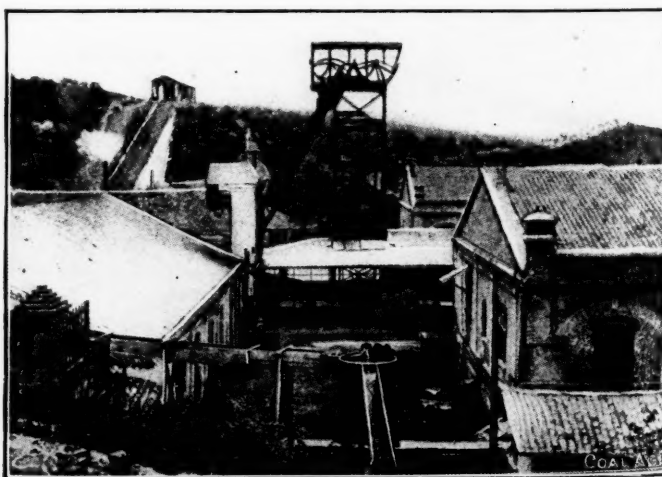


FIG. 2. HEADFRAME AND BUILDINGS AT SAME COLLIERY

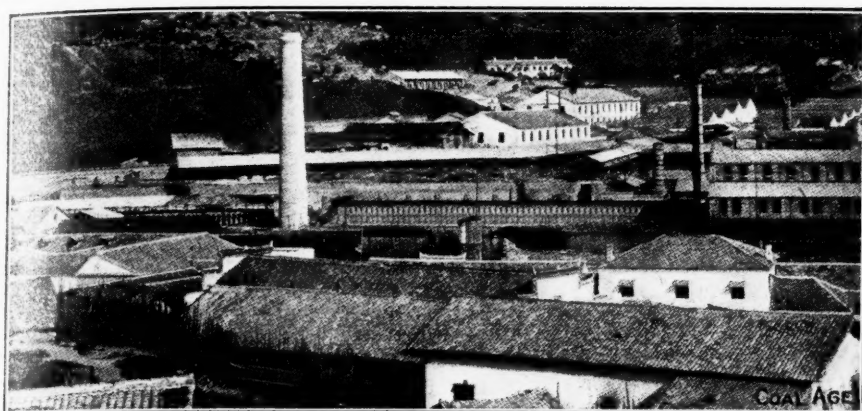


FIG. 3. THE P'ING-HSIANG COLLIERY, COKE OVENS AND WASHERY

TABLE I. APPROXIMATE ESTIMATE OF THE PRESENT COAL-PRODUCTION OF CHINA

Province	Anthracite	Bituminous	Sub-bituminous and Lignite
	Tons	Tons	Tons
Manchuria.....		25,000	1,000,000
Chili.....	840,000	2,090,000	150,000
Shansi.....	4,000,000	25,000	
Shensi.....		500,000	
Kansu.....		500,000	
Shantung.....	300,000	500,000	
Honan.....	1,000,000		
Ssu-chuan.....		500,000	
Kweichow.....		250,000	
Yunnan.....		300,000	
Chekiang.....		10,000	
Kiangsi.....		700,000	
Hunan.....		200,000	
Kuangtung.....		50,000	
Kuangsi.....		100,000	
Other provinces.....		100,000	
Total.....	6,140,000	5,850,000	1,150,000

Total production of all kinds of coal, 13,140,000 tons per annum.

The sketch map, Fig. 6, shows in general the coal areas of China. The dark spots in Fig. 7 show where coal has been uncovered in Manchuria.

The coals of China are as varied in quality as those of the United States, but this difference should be noted: the amount of lignite is comparatively small, and the proportion of anthracite to bituminous coal is larger than it is in the

United States. Willis has estimated that the anthracite resources of Shansi and the adjacent fields are practically equal to those of Pennsylvania. If this is in error it is probably upon the safe side, and the total coal resources of the Chinese Empire seem likely, upon careful mapping, to compare favorably with those of the United States.

MANCHURIAN COAL

In Manchuria, one large mine is now in operation at Fushun. This field, seen just above the word "Mukden" on the sketch map, Fig. 7, has been described in detail, so nothing further will be given here than the statement that the coal is sub-bituminous and of excellent quality. The mines, owned and operated by the South Manchuria Ry., had a production in 1910 of 830,328 tons, and are expected to reach 1,000,000 tons per year when the second of the two pairs of deep shafts (18 and 20 ft. in diameter) are in full working order. More recently the mines at Pen-hsi-hu, on the Antung-Mukden Ry., have been developed. The chief engineer at Fushun stated, in 1909, that the Pen-hsi-hu coal is friable and semi-bituminous, occurring in Jurassic strata, and not of especially good grade, but more extensive development may have disclosed seams of better

quality. The same remarks will apply to Sai-ma-chi; owing to its distance from the railroad no very serious attempts have been made to develop these workings. All mines in the South Manchuria Ry. zone are to be developed jointly by Japanese and Chinese.

Just east of Kwan-cheng-tze, coal similar to that at Fushun occurs in several places, and though the attempts at working have not been very successful as yet, the seams at this place are likely to become of great importance, as the branch railroad to Kirin cuts directly across them. West of the Liao River, a valuable and important field is said to exist, but I have not visited the locality and have no definite knowledge of it. Some time since, the Imperial Railways of North China attempted to exploit some seams of a true lignite a short distance north of the Great Wall, but they proved to be of too poor quality. Other localities where coal occurs are Yentai and Wu-hu-tsui, but the production is unimportant. As the workable coal in the Fushun field has been estimated at 800,000,000 tons, Manchuria is well supplied with coal. But the Manchurian coals are very friable, furnishing but a small proportion of lump size, and no good coking coal has yet been found.

Chili, which immediately adjoins Manchuria on the southwest, and is the metropolitan province, is now the most important producer of coal.

The lignite and bituminous coal of the Jehol district is produced by native methods, the nature of which can be inferred from the photographic views, Figs. 4 and 5, taken in the Western Hills. The Kin-Han (Peking-Hankow) railway district anthracite field and the Peking-Kalgan railway district field are northern and southern portions of one field, lying a short distance west of Peking. Hoover & Woo have described the Chinese Engineering & Mining Co.'s mines, at Tongshan and Linsi, in detail. These are the largest and most important coal mines in China. They are owned by an Eng-



FIG. 4. MOUTH OF A TYPICAL CHINESE COAL MINE



FIG. 5. IN CHINA, BASKETS REPLACE THE MINE CAR

lish company, but it has been proposed by the gentry of the province that the concession be purchased by the provincial government. Since the descriptions were written, the mines have been much developed and improved. They produce nearly all of the 1,400,000 tons, estimated in Table III, as the semi-official Lanchow mines, in the same field, have only recently been started and, though well equipped, seem unable to operate at a profit. The net return of the Chinese Engineering & Mining Co. mines for the year ended February, 1910, is given as \$1,184,871. The Ching-Hsing mines, on the railroad from Shih-chia-chuang to Tai-yuan-fu, are worked under German supervision, and have both Chinese and German capital. The production in 1910 was 150,000 tons. The Lincheng mines are operated to supply the Kin-Han Ry. with fuel, and are under the supervision of K. Y. Kwong. They have an output of 800 tons per day.

SHANTUNG COAL FIELDS

In Shantung, coal occurs in many places, but the larger part of the production comes from the mines owned by the Shantung Bergbau Gesellschaft, at Po-shan and Fang-tze; 252,816 tons of anthracite coal having been produced at the former place in 1910, and 230,064 tons of bituminous at the latter. These mines have washing plants. Some difficulty has been found in working, owing to the faulting and disturbance of the beds, and the native papers say that there is little profit in their operation. In this, as in every other coal field in China, there is a large amount of native mining upon a small scale. Farther to the southeast, near Yi-hsien, is a bituminous field which is said to be larger and better, but which I have not visited. The production of the native mines is already important. A large native company, called the Chung Hsing Kung Ssu, has been formed, machinery procured from Germany, and a railroad constructed from the mines 35 miles to the Grand Canal. This will probably be extended to connect with the Tientsin-Pukou R.R., and when the latter road is in operation, the production of coal in this district should become important.

AS MUCH ANTHRACITE IN SHANSI AS IN PENNSYLVANIA

Much has been written concerning the coal fields of Shansi. These anthracite seams are the most striking coal beds in the empire, as they are so thick, so little disturbed, so well exposed and so widely distributed, having an extent of nearly 200 miles north and south, and from 25 to 30 miles east and west. There are several seams, one of which is especially thick and persistent. Richthofen estimated the area of the field as 13,500 square miles, and Drake estimated the average workable thickness of the

TABLE III. PRODUCTION OF COAL IN CHILI PROVINCE FOR 1909

LIGNITE	
District	Tons
Jehol district coal-fields	150,000
Total lignite	150,000
ANTHRACITE COAL	
Kin-Han railway	600,000
Peking-Shanhaikwan railway	50,000
Peking-Kalgan railway	170,000
Total anthracite	820,000
BITUMINOUS COAL	
Peking-Shanhaikwan railway	1,400,000
Kin-Han railway	410,000
Peking-Kalgan railway	40,000
Lan-Ho and Jehol	100,000
Chow-yang-fu	110,000
Total bituminous coal	2,090,000

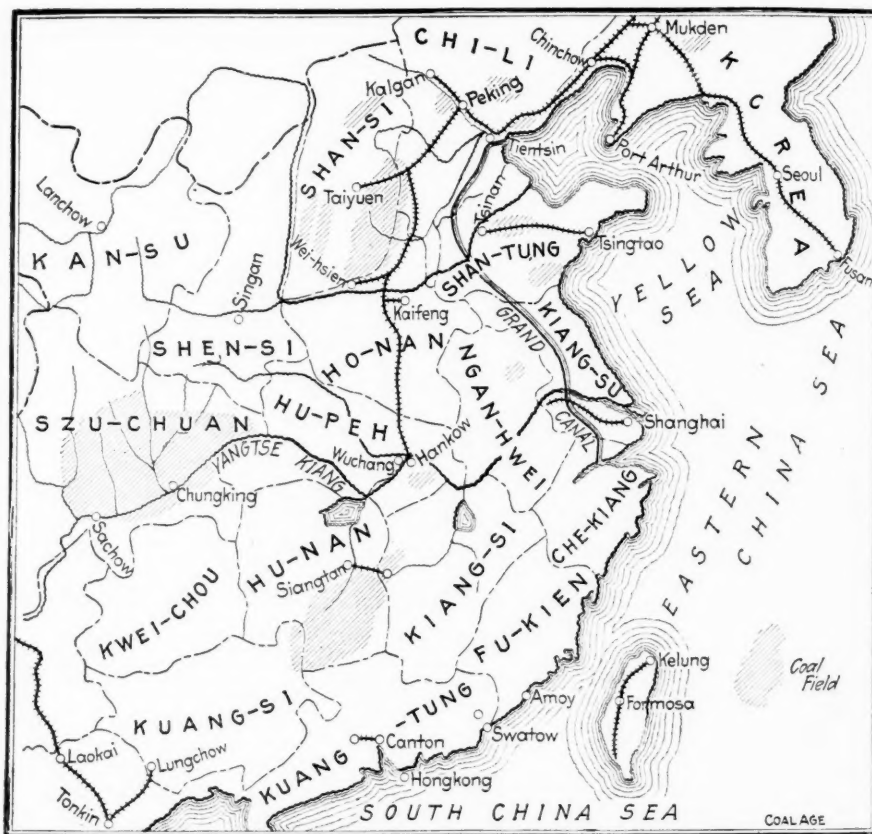


FIG. 6. THE CHINESE COAL AREAS AND RAILROADS

seams as 22 ft. As the beds are frequently but slightly inclined, this corresponds to a yield of over 22,000,000 tons per square mile of workable area, so it is safe to estimate that the anthracite resources of this part of China are at least equal to those of the United States.

Shansi also possesses considerable resources in bituminous and semi-anthracite coal, which is produced both to the east and west of Tai-yuan-fu.

SHENSI, KANSU AND SSU-CHUAN

In Shensi, which adjoins Shansi on the west, extensive coal fields are known to exist, and Richthofen thought that the bituminous fields to the west of Tai-yuan-fu were of equal extent and importance to the anthracite fields on the east. This is possibly too optimistic, but they are certainly very important. I have estimated the production of this province as 500,000 tons, but this is problematical, as the area is so little known. The same remarks apply to Kansu, which adjoins Shensi on the west. I have, for this reason, omitted Mongolia from Table I, though it is known to possess coal seams in those portions which adjoin Chili and

TABLE II. ANALYSES OF MANCHURIAN COALS

No.	Locality	Moisture	Volatile Hydrocarbon	Fixed Carbon	Ash	Sulphur	Analyst	Remarks
		Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.		
1	Fu-shun	6.30	39.34	52.90	3.18	0.27	C. H. Wang	Average of 7 analyses
2	Fu-shun	4.43	40.33	48.89	6.35	1.00		
3	Wu-hu-tsui	2.70	11.42	76.69	9.19	0.50	Geological Survey of Japan	Average of 3 analyses
4	Pen-hsi-hu	0.96	21.66	66.06	11.32	0.84		
5	Yen-t'ai	1.07	14.22	74.98	9.75	0.66		
6	Sai-ma-chi	1.39	25.58	60.47	12.25	0.80		

TABLE IV. ANALYSES OF SOME CHILI COALS

Locality	Moisture Per Cent	Ash Per Cent	Fixed Carbon Per Cent	Volatile Hydrocarbon Per Cent	Sulphur Per Cent	Fixed Carbon Ratio	Source	Remarks
1 Tongshan, C. E. & M. Co.	1.00	16.67	56.78	25.55	1.01	2.22	C. H. Wang	Coking, bituminous
2 Tongshan, C. E. & M. Co.	0.84	18.02	57.19	23.95	1.46	2.38	C. H. Wang	Bituminous
3 Tongshan, C. E. & M. Co.	1.37	21.72	53.81	23.10	2.55	2.33	C. H. Wang	Non-coking, bituminous
4 Tongshan, C. E. & M. Co.	0.93	12.29	59.75	27.03	3.90	2.21	C. H. Wang	Coking, bituminous
5 Tongshan, C. E. & M. Co.	0.90	13.55	70.33	15.22	2.26	4.62	C. H. Wang	Coking, bituminous
6 Tongshan, C. E. & M. Co.	0.77	18.59	53.28	27.40	1.11	.....	C. E. & M. Average	
7 Linsi, C. E. & M. Co.	0.77	19.18	51.97	28.05	0.88	.....	C. E. & M. Average	
8 Ching-Hsing	0.54	13.49	61.16	24.81	2.26	2.46	C. H. Wang	Coking, bituminous
9 Chai-t'ang	2.11	6.67	68.23	22.99	0.19	2.97	C. H. Wang	Non-coking, bituminous
10 114° 30' E., 38° 45' N.	1.20	12.97	80.50	5.43	0.97	14.81	C. H. Wang	Hard, dry anthracite

Shansi. Passing directly south, to Ssu-chuan, Kwei-chow and Yunnan, our knowledge is in a similarly unsatisfactory state. Richthofen, who only traversed the northeastern part of Ssu-chuan, says, in substance, that coal is very generally worked throughout the province, as the Mesozoic strata are extensively folded and are cut across by the rivers, thus conveniently exposing the seams. So far as I can learn, the coal here is not of as good quality as other deposits more favorably situated with respect to the larger markets, which, together with the difficulties of transportation on the Yangtze, restricts production to the amount required for local needs.

The anthracite field of Shansi extends southward into Honan province and at Ching-hua-hsein, the Peking Syndicate is operating several shafts, equipped with modern machinery. This company has had many vicissitudes, but is now meeting with success; the production during 1910 is given as 357,205 tons. There is a good deal of production by native methods in this province.

The great southern coal field lies to the east of the Hsiang River, in Hunan and Kiangsi provinces. The greater part of the field is in the former province, but the most important producer, the collieries of the Han-Yeh-P'ing Iron & Coal Co., are at P'ing-hsiang, in Kiangsi. A view of the P'ing-hsiang colliery, showing two banks of coke ovens and the washing plant, is given in Fig. 3, and a nearer view of one bank of ovens is shown in Fig. 1. The steel headframe of the shaft is shown in Fig. 2. This coal is a bituminous coking variety (with associated thin seams of anthracite), which contains 28 per cent. of ash as mined, but after washing and drying, an average analysis, furnished by the company, gave:

ANALYSIS P'ING-HSIANG COAL

	Per Cent.
Volatile hydrocarbons	22.35
Fixed carbon	68.90
Ash	8.70
Sulphur	0.10

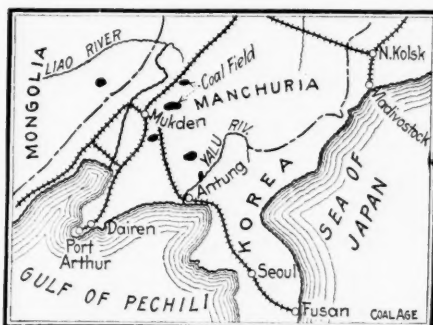


FIG. 7. MANCHURIAN COAL FIELDS

It yields excellent coke, which supplies the blast furnaces at Han-Yang and the general market; more than 107,000 tons having been produced in 1909. The production for 1910 is given as 610,000 tons. The coal fields extend west and south from this point for a great distance, and

Richthofen says that southward the coal is anthracite and of better quality. Transportation is difficult, owing to the shallowness of the rivers; so development has lagged; but when the Canton-Hankow Ry., now under construction, is in operation, this field, which I regard as only second in importance to the Shansi field, is likely to develop greatly. Some of the most important mineral regions in China lie to the west of the projected railway line, and the transportation facilities thus afforded should lead to a great increase in mineral production.

CONCLUSIONS

In conclusion, it should be said that the coal fields of China are of great extent, the coal is generally of good quality and the fields are widely scattered, so that no parts of the empire are far distant from the sources of supply. In extent and quality the coal resources of the empire compare favorably with those of the United States. As a rough comparison, it may be said that Chinese coals are slightly younger than those of North America, most of the fields being upper Carboniferous or Permian. In the north, Jurassic and Tertiary coals occur, but except for the Fushun field, are of little importance as yet. Bituminous coking coal is very common; coke made by native methods can be obtained almost anywhere in the empire. When made from washed coal, the resulting coke is of excellent quality, and will afford an abundant supply for the smelting industries which are likely to develop. The anthracite is of excellent quality, but the bituminous is often friable, yielding an excessive proportion of fine coal. When worked on a large scale, this can be washed and converted into coke. The Chinese custom is to make the dust into briquettes with clay as a binder. These are dried before burning. Recently the number of mines equipped with modern machinery has become comparatively great, and the present supply amply meets the demands.

TABLE V. ANALYSES OF SHANSI COALS

No.	Locality	Moisture Per Cent.	Volatile Hydrocarbon Per Cent.	Fixed Carbon Per Cent.	Ash Per Cent.	Sulphur Per Cent.	Phosphorus Per Cent.	Analyst	Sp. Gr.
1	Chuang-chuang-kou...	0.91	8.20	78.75	12.14	0.67	0.476	C. H. Wang	
2	Hon-ho-kou...	0.94	6.15	85.70	7.21	0.59	n. d.	C. H. Wang	
3	Han-ho-kou...	0.38	8.55	84.00	6.72	0.409	0.23	F. N. Lu	1.38
4	Tuan-chia-kou...	0.76	6.44	79.10	13.66	0.683	1.80	F. N. Lu	1.35-1.38
5	Lao-hsien-shang-kou...	0.66	4.49	89.50	5.46	0.509	2.53	F. N. Lu	1.4
6	Nan-t'ien-meng...	2.01	7.05	81.35	9.61	0.867	n. d.	F. N. Lu	1.3-1.5
7	Meng-tsen-cheng...	0.33	4.39	89.25	6.03	0.405	2.15	F. N. Lu	1.3 high
8	Chuang-chuang-kou...	14.75	19.28	52.42	13.45	0.890	n. d.	F. N. Lu	
9	Chang-tsai-kou...	0.50	14.20	75.89	9.41	0.258	n. d.	C. H. Wang	
10	Tung-chia-chuang...	1.73	10.72	84.22	3.33	1.150	n. d.	C. H. Wang	
11	.....	1.93	3.45	81.44	14.17	0.35	n. d.		
12	.....	2.91	.....	86.80	9.88	0.41	n. d.		

Sample 1, semi-anthracite, does not coke. Sample 2, hard dry anthracite. Sample 8, coked in crucible, probably due to oxidation. Sample 9, semi-bituminous, coked in crucible. Sample 10, semi-anthracite, does not coke. Sample 11, average of six samples by Drake. Sample 12, average of six samples by Shockley. n. d. = not determined.

Who's Who—in Coal Mining

Devoted to Brief Sketches of Prominent Men, Their Work and Ideas

In no other industry is there such a lack of unison as in coal mining. For this reason, men like Samuel A. Taylor, of Pittsburg, who are possessed of the ability to draw factions, as well as individuals, together, are assets of no small value.

Mr. Taylor long ago proved himself the champion banisher of discord. One cheering look from him is sufficient to cause the blackest, most threatening clouds to scurry away and leave the sky as clear and serene as a placid lake on a summer afternoon. His supply of oil for disturbed waters comes from an everlasting fountain of inexhaustible flow, and the most tumultuous seas are rendered calm as death when subjected to his tender efficient care.

Concentration calls, not for talented men, nor yet for geniuses, but for men who are trained to do one thing as well as it can be done. In this matter of "singleness of purpose," Mr. Taylor is unusually proficient, for he has never once moved his residence from Allegheny County since he was born in North Versailles Township, Oct. 24, 1863.

He is an excellent example of the class of "Stay-at-Homes," whose mental philosophy includes a belief in the story of the "rolling stone." Samuel takes no chances on knocking off any moss, although he has confined the growth of that much desired substance to those parts of his being, not directly connected with human ideas and modern notions.

Mr. Taylor was educated at the common schools until 10 years old. At this early age he began working in the coal mines, which line of effort he followed until he was 15, when he gave up the mines and learned the carpenter trade.

At 18, he entered the Polytechnic Institute of Allegheny, Penn., and at 20 commenced his college course in civil engineering at the Western University of Pennsylvania, now the University of Pittsburg. "S. A." graduated from this latter institution in the class of 1887, and immediately got a job in the structural-iron department of the Homestead Mills of the Carnegie Steel Co., under Julian Kennedy.

He left the Carnegie people in 1888, and accepted a position in the construction department of the Pennsylvania R.R. While with this latter concern he had charge of the construction of a number of branch railroad lines until 1893, when he opened a general engineering office in Pittsburg, which was conducted by him



SAMUEL A. TAYLOR

until the close of 1904, when this private engineering practice was turned over to three of the men who had been associated with him.

Since 1904, "S. A." has acted as a consulting engineer, and has managed a number of coal and water-works plants. He organized and became president of the Domestic Coal Co., the Crescent Coal Co. and later the Mifflin Coal Co. and the Corona Coal & Coke Company.

He has served on a number of mining commissions and as director of several banks, water companies and coal companies. Is a member of the Engineers' Society of Western Pennsylvania, and during the last year was president of the Coal Mining Institute of America. At the recent meeting of the American Mining Congress, in Chicago, Mr. Taylor was elected president of that body, and is today actively engaged in bringing the influence of the Congress to bear on the subject of necessary legislation looking to a betterment of conditions in the coal and metal industries.

And without I miss my guess, "Samuel A." will get some results if playing politics is all that is essential to the accomplishment. He is neither a novice nor bungler at the game, and can come nearer the consummation of a fixed plan, through affability of manner and earnestness of purpose, than paid professionals can ever hope to get by sharp trading and the bestowal of party patronage. There are many schools calculated to turn out capable politicians, but when a man has over-

come the obstacles that confront a practicing engineer, and in addition has a bowing acquaintance with the inner circle of Pittsburg politics, then he is eligible to an honored place in the national hall of political fame.

Samuel Taylor is also a member of the American Society of Mining Engineers, the American Society of Civil Engineers, and a string of scientific organizations, the enumeration of which would make the "etc's" affixed to King George's name appear like a lonesome college degree compared with an open discussion on "how to fight a mine fire." In fact, no technical society today is bold enough to organize without having Samuel on its charter-member list. Might as well dispense with by-laws, officers and rules as try to get along without him.

The Association of Pittsburg Coal Operators long ago recognized Sam's cementing qualities and made him their secretary. Some day bituminous operators generally will want a Moses to lead them from the wilderness and it is a sure bet their searching gaze will light on "S. A.'s" assuring smile.

Pittsburg has long deserved recognition as a seat of mining education, and this cherished ambition may now be realized, due to Mr. Taylor's election, on Apr. 1, to the deanship of the mining school of the University of Pittsburg. For some years he has been trustee of his old Alma Mater, and when the popular and able Prof. Wadsworth resigned recently, the university officers chose "Sam'l A." to fill the place.

Ask Mr. Taylor to prepare a paper for presentation before a technical society or any meeting of serious-minded men, and if you are not particular to specify the subject, you can stake your faith and rest easy in the belief that Samuel will discuss workmen's compensation and the principle of old-age pensions for coal-mine employees. One such paper, prepared and read by him, a few years ago, has been used as a guide to a recent report of the American Mining Congress, whose suggested enactment has become the basis of proposed legislation in several states.

But it must not be inferred that S. A. Taylor plays a harp with a single string. He has marked convictions on the subject of conservation and believes that the sale of coal by analysis is the prospective cause of more willful waste of available fuel than the careless mining of earlier days.

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This journal has a direct aim—a single purpose—which is to help advance the coal-mining industry. Its creed embodies the dissemination of knowledge and the free interchange of ideas among its readers, all of whom are invited to become regular contributors.

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COAL AGE

National Control of Mines

Our correspondent in his interesting article on the "Expropriation of Mines" reviews the recent British strike, and suggests that the coal mines of England and Scotland, before long will be purchased by the government of the United Kingdom. The Socialists in the Mine Workers' Union have an expectation that the same course of action will be followed in America. It is, therefore, an appropriate subject for consideration.

The demand for such nationalization seems to come not so much from the Socialists as from such patriotic people as have for many years been depreciatively dubbed "jingoists." These people appear to believe that by nationalizing the mines, the government will have a firmer hold on the mine worker and will be able to compel him to work when he is prone to seek the redress of what, rightly or improperly, he considers his wrongs.

We cannot be sure that strikes will not occur despite such an arrangement. In fact there have been several strikes threatened and not a few consummated where public utilities were in control of the national government. There are growing signs of a disaffection of postal employees and it appears that segregation has much to do with the fact that their discontent has not burst actively into flame. In Italy and France, strike suspensions have occurred on state railroads, and it is a foregone conclusion that any well organized industry which has once been afflicted with strike disturbances is likely to continue to be a fertile field for them even after the government has taken direct charge. Moreover it seems possible that strikes which paralyze a whole people could be prevented without such expropriation.

To pass laws forbidding the suspension of work by the employees of the state is a measure just as subversive of the rights of the individuals of the proletariat as to pass or enforce laws against unreasonable collectivity when bargaining for wages with private employers. In fact

we believe that the control by the government of the worker in a nationalized industry would be nil.

The advocates of the new order have confused the horse with the rider. The miner would run the state, rather than the state govern the miner. This power of the operative to rule is undoubted. In fact, any organized body working in the production of a staple product and comprising over 5 per cent. of the population has that power—the farmer of America for instance. So far however, patriotism, segregation and self protection have prevented the workers in any industry from using their destructive power to involve themselves and others in a common overwhelming misfortune.

Surprised to find the Ultra-Conservatives for once in accord with them, the Socialists add to their argument the further consideration that the government with nationalized mines will pay the men a sufficient wage. The fitting wage is a difficult matter to determine, and the state might well differ with the miner as to what constitutes such a remuneration. Judging by recent declarations, we suppose that the approved miners' wage should be not less than 25 per cent. above existing labor prices. This statement cannot well be discussed with any hope of a gratifying solution. Let it be conceded, however, that the government would give such an increase. It would then be a notice to all workers that wages in general needed a similar advance. The usual readjustment would follow, and the miner would be in no manner benefited.

The only argument which seems to have any validity is one which few are now advancing, though it has had in the past no little attention. Wages could not be readily raised in purchasing power, but it is possible that if the mines were acquired by the government, profits could, in some cases, be reduced. The government could operate the mines on a small margin not to exceed the interest charge consequent on the scale of bonds to affect their purchase. This rate of in-

terest would be three or four per cent. The average owner is perhaps making twice and certainly no more than three times that figure.

The coal operator of the British Isles is not among the more wealthy capitalists of Great Britain. In fact, it may be pointed out that it is not he who is the recipient of excessive profits. The land holders of city properties occupy this enviable position. In fact, if capital needs the curb of expropriation for the benefit of the poor, the coal operator should certainly not be the first to taste of such a socialistic experiment, because it seems probable that the public in that event would not be markedly benefitted.

In fact it is likely that the little difference between the profit, which the government might demand, and the average profit in British mines today would be more than covered by the inefficiency of the bureaucracy. If any improvement could be looked for, it must be expected to arise from the closing down of some few collieries where conditions are peculiarly unfavorable to successful operation and liberal wages. This, however, would involve a colonizing of such parts of England and Wales, as are most suited for coal production and a decrease in the output of Scotland, the Forest of Dean and Somersetshire, where coal mining is conducted under difficulties. It is likely that such an enforced exodus would be unwelcome to those colliers who live in these parts, and would not be agreeable to the industries and trades, which find in the purchases of the miners, their means of support.

Sober second thought it seems will nationalize lands, railroads, breweries and distilleries long before the mines and quarries of the United Kingdom.

The End of Coal Mining?

Press reports from England state that Sir William Ramsay has announced the perfecting of a system for extracting power from the coal in its native bed. It is only from such a man as Sir William Ramsay that such a statement would be taken seriously. Should his system prove feasible, the changes in conditions of employment and the economies it will be possible to effect are almost beyond comprehension.

According to the most reliable information now available, Sir William Ramsay proposes to tap the coal seams by

means of drill holes, and by igniting the coal, drive off the gases, which will be utilized in gas engines for generating electricity.

While no intelligent criticism of the scheme can be attempted until the full plans have been made public, we can nevertheless see many obstacles to its consummation. Among these would be the provision of an adequate air supply to insure proper combustion, the difficulty of maintaining same, due to the accumulations of coke and the subsidence of the roof, and finally the necessity for an elaborate plant for treating the gases, which would naturally carry high percentages of impurities and would require careful washing before they could be used in the gas engine. Sir William would also face a further difficulty here in the shape of a patent taken out in 1909 by A. A. Betts of New York, which reads in part: "Power gas is generated from unmined coal by starting a fire at the base of one or more shafts or drill holes, supplying the air and steam through a pipe, and withdrawing the gas through the same or other shafts or drill holes."

On the other hand, there is no question but what the proposed change offers food for serious thought. The enormous hydro-electric installations of the West have fully demonstrated the feasibility of long high-power electrical transmission, while the losses involved in mining, handling and re-handling the coal from the working face to the consuming power plant are very great.

Mechanical Handling of Coal

Great progress has been made of late in our methods of handling and preparing coal. At best, its transfer from the working face of the mines to the bin of the consumer involves a more or less frequent lifting up and dropping down of this fragile material, but recently numerous devices have been sought and achieved which not only increase the efficiency of colliery operation, but tend to prevent undue breakage and degradation of the product. Conveyors have been devised which largely eliminate the prevalent five- or ten-foot fall from loading pockets to car bottom, and the long toboggan-like gravity chute has been condemned and generally abandoned in favor of spirals and similar retarding constructions.

It may be questioned, however, if these

efforts have not been somewhat disconnected and sporadic in character and directed toward the correction of evident faults in existing methods, rather than dedicated to the application of a recognized principle, or set of principles, which if consistently adhered to, might be expected to produce more certain and comprehensive results.

For example, there is much evidence to support the contention that in handling coal, dependence on the force of gravity should be avoided as far as practicable, instead of embraced wherever possible as heretofore has been common practice. The mine car which is handled to or from the cage or dump by means of a descending grade may or may not move as required, depending entirely on the condition of its running gear. The railroad car which in summer has to be guarded zealously against running away, in winter may have to be coaxed along with a pinch bar.

More evident still are the limitations of gravity in connection with the distribution of material in our anthracite breakers. The character of the coal varies not only from time to time as different seams are brought within the scope of operation, but varies continually during the course of a single day, where the colliery draws its supply from several sources. The fixed gravity chute offers inadequate means for regulating the flow under these conditions, with the result that provision is usually made for the slowest material, and the balance is allowed to batter itself to pieces in precipitate flight.

It would seem that much might be accomplished toward eliminating these and many similar defects by an extended application of methods for handling the material mechanically. This is unquestionably the tendency of modern practice. We would suggest that it be recognized and reduced to a working principle. Power-operated cagers and car-handling systems, face and distributing conveyors, loading booms and many similar devices should mean positive, continuous, reliable and easily regulated progress of the coal through the course of the various colliery operations. They also should mean decrease in breakage of the product. It seems reasonable to believe that the increased efficiency and improved output which might be attained in this way would greatly over-balance the higher cost of installation.

Discussion by Readers

Comment, Criticism and Debate upon Previous Articles, and Letters from Practical Men

Coal Dust in Mine Explosions

I have only now had the opportunity of reading the editorial remarks in COAL AGE, Mar. 2, on "Afterdamp" and "Coal Dust Heterodoxies." Having just returned from attending the inquest and investigating the Merritt disaster, I beg to offer a few remarks, which I hope will provoke further discussion that will help to elucidate the questions we are studying.

First, with regard to afterdamp, I take this term, as used in mining, to mean any mixture of gases resulting from the explosion or violent inflammation of gas or dust, in a coal mine. Some years ago I was myself puzzled by the effect of afterdamp on the eyes. I attributed this effect to ammonia, but a student and lecturer on mine gases (Dr. Carnelly, now dead) assured me that this was not probable and made tests to prove it. If I remember correctly, he suggested that the effect was due to an oxide of nitrogen that might be produced in a mine explosion. Whatever is said in regard to the composition of afterdamp one thing is certain, that the afterdamp resulting from an explosion in a mine has never the same composition. The kind and quantity of gases formed will depend wholly on the conditions attending the explosion.

COAL DUST HETERODOXIES

Your remarks under this head appear to be principally based on the extract you quote from my paper entitled "Some Coal Dust Explosion Problems." This paper, which was prepared and presented to the South Wales Institute of Engineers, is now under discussion by the institute. I regret that the whole of the paper was not before you when making the comments you did, as this would have enabled you to have prepared a better synopsis. For example, you make no reference to my quotation from the French experiments at Lievin and you omit to mention or describe what forms the most instructive part of the paper; namely, the photographs showing the damage done to the testing tubes or galleries and the general effect of the explosion.

Your editorial leads one to infer that I have been writing on the detonation of coal dust; whereas, the cases I quote are suggestive only of the detonation of gases created at a certain stage in a coal-dust explosion. This is not a detonation of

the dust particles, each floating in its own balloon of gas.

WATERING IN COAL MINES

The last paragraph in the editorial to which I have referred gives a clear opinion on the subject of watering or dampening of mine air that is directly contrary to my own expressed opinion and writings on this subject. I am not speaking now of watering down or spraying accumulations of dust at the working face or on roadways; but refer to the humidification of the mine air by spraying. It will be remembered that Prof. Harold Dixon, some years ago, published his conclusions in regard to the effect of coal dust in mine explosions, in a paper entitled "The Rate of Explosions in Gases." In this paper, Professor Dixon distinctly states that mixtures of certain gases with air give the highest speed in explosion when the mixture contains 5 per cent. of water vapor. The point I wish to emphasize is that *it is this high speed produced when water vapor is present that gives the detonating effect of the gas* to which I have referred. If some high authority on explosive gases can explain away Professor Dixon's conclusions in this regard, I may be inclined to think that the humidification of the mine air is of some value. Up to the present time this has not been done and we must believe that the presence of water vapor in mine air is a factor that will increase the speed and violence of an explosion. To put this a little more strongly, I would say, that the presence of the water vapor tends to cause a detonating effect, which is the point intended to be brought out in my paper. I am glad to note that in closing you express a lingering doubt as to the ability of humidification to immunize the mine as we might wish it could.

[We are glad to give space to these comments of Mr. Ashworth and regret that the entire copy of his paper is not available at the present time. Mr. Ashworth has certainly made some valuable deductions that cannot fail to make interesting subjects of discussion. It is only just to Mr. Ashworth, whose views in regard to mine explosions command respect, to state here that he has always advocated the thorough wetting down of the coal face and immediate vicinity before firing blasts in dusty mines where blasting is dangerous; and the spraying of the mine roads to such extent as

may be necessary to keep the air on these roads clear. See "Mine Gases and Explosions," p. 193.—EDITOR.]

The Fireboss Question

I would like to congratulate the writer of the communication signed "A Fire Boss, Western Pennsylvania," COAL AGE, March 9, p. 717. He suggests that there should be a law passed, or that the Department of Mines should make a ruling prohibiting mine bosses and mine foremen who are regularly employed as such from acting in the capacity of fireboss at any mine generating explosive gases. This strikes me as an excellent suggestion. We firebosses have felt for a long time that we have no protection in our work, and that we are particularly subject to difficulty in attempting to carry out the state mine law and at the same time please our employers, by whom we are paid.

I would suggest that all firebosses who feel the same write to their respective representatives, at Washington, D. C., and also to the legislators of their respective districts, at the State Capitol, urging the passage of a law such as has been suggested. The law should also require that all firebosses charged with the responsibility of the daily examination of mines generating explosive gas, shall act under the jurisdiction of the State Mining Department, in their respective states. The law should make all firebosses in gaseous mines responsible solely to the district mine inspector and subject to his control, or to the Department of Mines, in each state. I think such a law could be worked out all right and would be more satisfactory, both to the miners and operators. There is no question but that such legislation would please all firebosses.

AN INDIANA FIREBOSS.

Electrical Machinery for Coal Mines

Referring to the article, "Electrical Machinery for Coal Mines," in COAL AGE of Mar. 16, and to the last paragraph but one on p. 737, I note that the author, in speaking of the speed variation of the three-phase induction motor, says that by cutting down the number of pairs of poles by one-half, the speed of the motor is reduced in the same proportion. Also, in the last paragraph, he states that, for a machine having six pairs of poles, the speed would be reduced 33 1/3 per cent. by cutting out two pairs of poles.

I would differ with the author in these statements and would say that, as I figure it, reducing the number of poles of an induction motor by half would increase the speed in the inverse proportion. In other words, speed varies inversely as the number of pairs of poles, that is, of course, theoretically. Practically, the slip must be taken into consideration in making a statement of this kind.

I would be interested to hear what the author has to say in regard to this criticism and how he can explain the relation of frequency to speed and pairs of poles in such a way as to agree with the statement he has made. As I have always understood it, frequency equals pairs of poles multiplied by speed. The author seems to figure it the other way.

Syracuse, N. Y. H. V. BROWN.

[It is quite apparent that the statements referred to by Mr. Brown are in error, and should be changed to read as he has suggested.—EDITOR.]

A Graphic Solution for Pumping Problems

Note—From the "American Machinist."

When dealing with pumping questions it often entails a fair amount of "figuring" to obtain say the power required to pump a certain quantity of water to a given height, when the efficiency of the pump is known, or having a certain amount of power available how much water can be raised to a certain height per hour? To arrive at any of the above answers a considerable amount of time is involved, whereas with the following

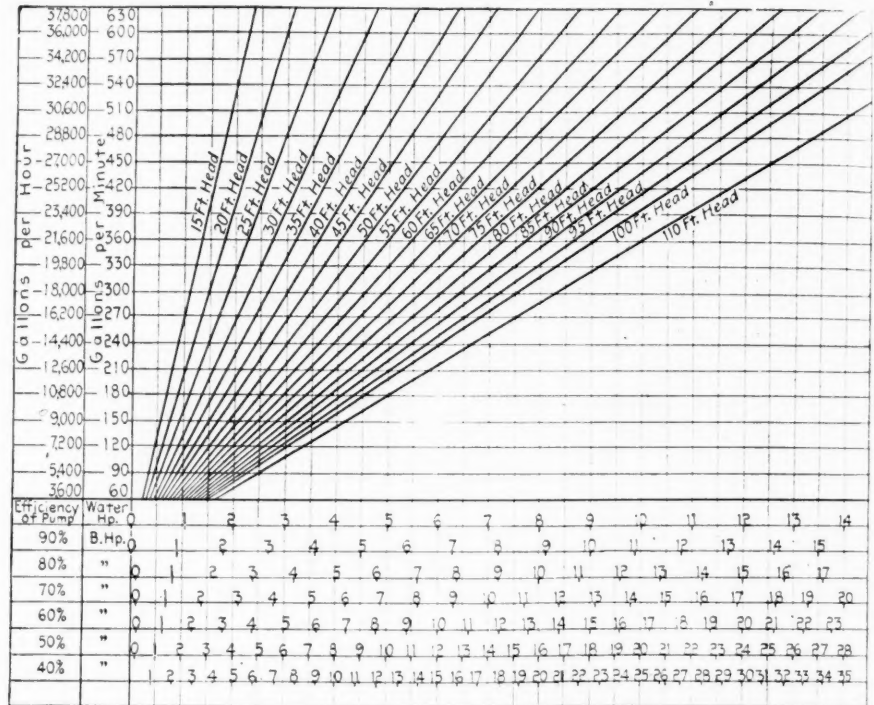
diagrams any of the above requirements can be seen at a glance.

The accompanying diagrams give the brake horsepower, number of gallons per minute, and per hour, the various heads in feet, and the pump efficiencies from 15 ft. up to 300 ft. head.

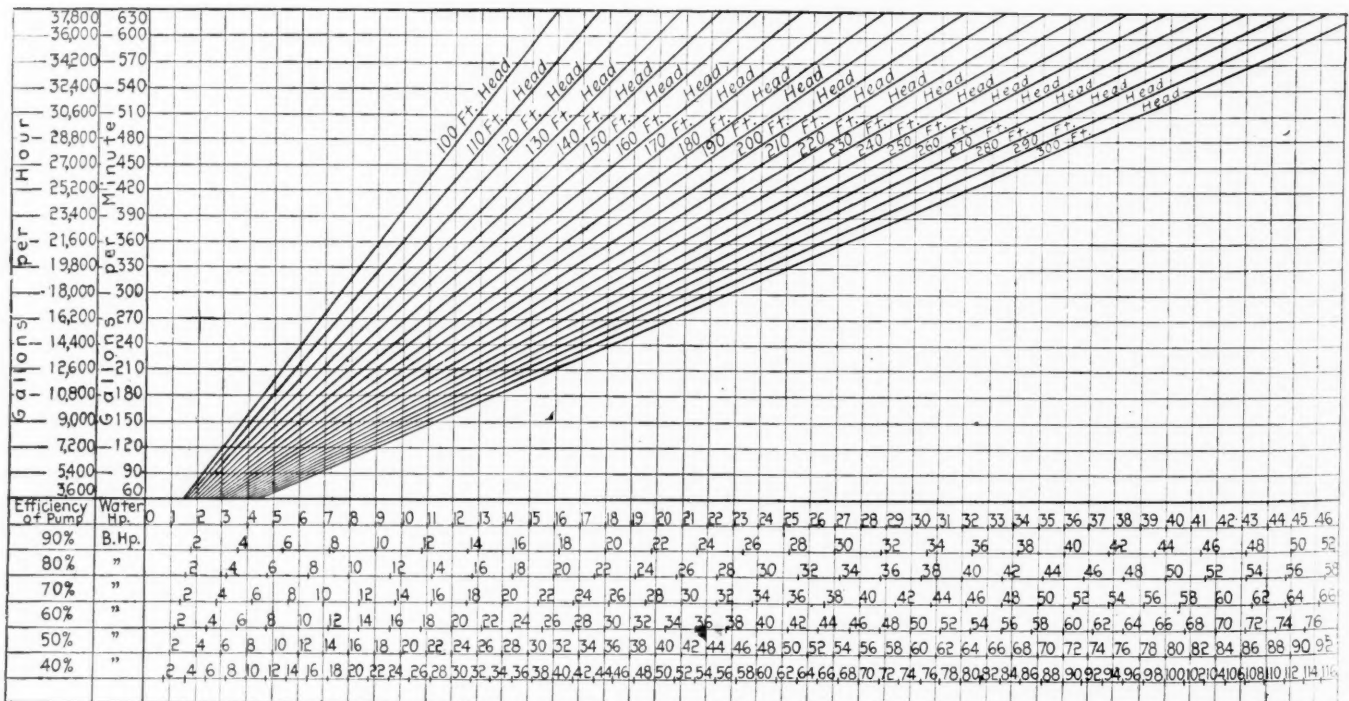
As an example, we require to pump 360 gal. per minute with a total head of 85 ft. and the efficiency of the pump is 60 per cent. What is the brake horsepower required?

On the left-hand side of the diagram is shown gallons per hour and gallons per minute. On the line 360 gal. trace along toward the right hand until the horizontal line intersects the diagonal line marked "85 feet head." Then trace the vertical line at this intersection downward and at the bottom of diagram will be read the b.hp. = 13, on the horizontal line of 60 per cent. pump efficiency where the vertical line intersects.

Letchworth, England. W. E. WORT.



PUMPING DIAGRAM, 15- TO 110-FT. HEAD (U. S. GALLONS)



PUMPING DIAGRAM, 100- TO 300-FT. HEAD (U. S. GALLONS)

Inquiries of General Interest

All Questions Must be Accompanied by Name and Address—Not for Publication

Short Circuiting Air Current, Effect on Speed of Fan

Some mining men claim that when the mine fan is working up to nearly its full capacity, and the air is short-circuited, the fan will speed up and the water gage will fall. According to my ideas, if the water gage is placed so that it only measures the mine resistance, the short-circuiting of the air current at the shaft bottom and the consequent cutting off of the mine resistance, will cause a fall of water gage, and at the same time the fan will slow down somewhat, owing to the increased amount of air passing. If, however, the water gage is so placed that it measures the resistance of the fan and the mine the water gage will be increased when the air is short-circuited, while the speed of the fan will be slightly reduced, as before. This result, I believe, would be due to the resistance in the fan being somewhat increased by the increased flow of air through the fan.

I would like to have this question definitely answered, and also to see it discussed by the readers of COAL AGE.

BENJAMIN HARTILL.

Johnstown, Penn.

Our correspondent is correct in his first statement; namely, when the air current is short-circuited at the foot of the shaft, the water gage will fall and the speed of the fan be reduced, assuming the power applied to the fan shaft remains constant. There is, however, no position of the water gage possible in which it will measure both the resistance of the mine and that of the fan. The water gage reading taken at the bottom of a shaft measures the difference between the intake pressure and that of the return at that point, which difference of pressure (lb. per sq.ft.) multiplied by the sectional area of the airway where the reading is taken (sq.ft.) represents the resistance of the mine in by from the point where the water-gage reading is taken. On the other hand, when the water gage is placed on the fan drift its reading measures the difference between the atmospheric pressure and the pressure in the fan drift (lb. per sq.ft.), which multiplied by the sectional area of the fan drift (sq.ft.) represents the total resistance met by the air current in its passage from the fan to the point where it is discharged into the atmosphere.

There is no way of measuring the resistance of the fan to the passage of the

air. This can only be estimated, and determines what is called the efficiency of the fan. It will not be necessary to consider the matter of the efficiency of the fan when the air is short-circuited or the mine resistance cut off, further than to say the quantity of work lost or absorbed in the fan itself varies practically with the cube of the quantity of air passing through the fan.

Assuming 100 horsepower is applied to the fan shaft, as indicated by an indicator card taken from the engine driving the fan; perhaps, of this amount, 80 horsepower is consumed in circulating the air through the mine and the shafts, leaving 20 horsepower absorbed or lost in the fan. Assume that 80,000 cu.ft. of air are in circulation before the air is short-circuited; and after short-circuiting the air by setting open the main separation doors at the foot of the shaft, say 100,000 cu.ft. of air are passing through the shafts. The quantity of air passing through the fan is thus increased in the ratio

$$\frac{10}{8} = \frac{5}{4} = 1.25$$

and the power absorbed or lost in the fan, increasing as the cube of this ratio, is $1.25^3 =$ say 2 times or double the previous loss of power. That is to say, after short-circuiting the air, 40 horsepower is lost in the fan and the remaining 60 horsepower is therefore consumed in passing the air through the shafts. These results are tabulated below.

Before change:		
Fan.....	20 hp.	80,000 cu.ft.
Mine and shafts.....	80 hp.	
After change:		
Fan.....	40 hp.	100,000 cu.ft.
Shafts.....	60 hp.	

From the above it is clearly seen that owing to the increased loss of power in the fan the effective power available for moving the air is decreased from 80 horsepower before the air was short-circuited to 60 horsepower after the change was made. It is this effective work that is concerned in turning the fan, and the speed of the fan varies as the cube root of the horsepower; or, in this case,

$$\sqrt[3]{\frac{60}{80}} = \sqrt[3]{0.75} = 0.9$$

That is to say, the speed of the fan after short-circuiting the air will be about 0.9 of what it was before the air was short-circuited. If the first speed was, say 100 r.p.m., the second speed will be about 90 r.p.m. In common mining practice the

speed of the fan in short-circuiting the air drops about 5 or 10 per cent., according to conditions.

Direction in which a Mine Explosion Propagates

Does an explosion of gas or dust in a mine always develop its greatest magnitude in the direction from which fresh air comes, or against the air current?

TOM. E. FITZGERALD.

California, Penn.

In considering the explosion of gas or dust, the mine or that portion of it where the explosion occurred must be considered, in most cases, as a *cul de sac*, or confined space in which the gases produced by the explosion expand toward the opening as though shot from a gun.

This condition, however, describes only the initial force resulting from the ignition and explosion of an accumulated body of firedamp, or the violent inflammation of a cloud of dust, which forms the center of the disturbance, and from which the force radiates in every direction. The force cushions in by but expands freely outward or in the opposite direction.

There are two general types of explosions in mines with respect to the manner of their propagation. (1) Propagation by percussion; (2) propagation by burning. In the first of these two types of explosion the force or explosive effect is transmitted with lightning rapidly throughout the entire mine. There is much that is yet to be learned in regard to the principle of action of this form of explosion. Theories have been suggested to account for the phenomena, and these are being closely studied, at the present time. Whatever may be true in regard to the principle by which the explosive wave is transmitted, it is a fact that this type of explosion may be either with or against the air. The direction of the air current appears to have little effect in determining the direction of the blast.

In the second type of explosion, that in which the explosive wave advances more slowly, by burning the combustible material (gas and dust) lying in its path, the explosion can advance any great distance, only in the direction in which it is fed by fresh air. That is to say, the advance is in the direction against the air current. The reason for this is clear when one considers that owing to the lack of air for its support the explosion would be snuffed out in its own trail, in the opposite direction.

Examination Questions

Selected from State Examinations, or Suggested by Correspondents

Interesting Questions

(Answered by request)

THICKNESS OF MINE DAM REQUIRED TO SUPPORT A GIVEN HEAD

Ques.—Having decided to dam off a heading 15 ft. wide and 6 ft. high, with a concrete dam, using a mixture of cement, sand and cinders, in the proportions 1:3:5; it is desired to know the total pressure against the dam and the thickness of the dam required to withstand such pressure (a) when the water stands 5 ft. above the pavement, at the dam; and (b) when the water will back up and reach a level 30 ft. above the pavement at the dam.

Ans.—The total pressure exerted by water on a dam is found by multiplying the wetted area of the face of the dam (sq.ft.) by 62.5 (wt. of 1 cu.ft. of water in lb.), and this product by the vertical height of the surface of the water above the center of gravity of the wetted area.

(a) The water being 5 ft. deep at the dam, the wetted area of the face of the dam is $5 \times 15 = 75$ sq.ft. The center of gravity of this area is its center of figure, which is 2.5 ft. below the surface of the water. The total pressure on the dam, in this case, is

$$75 \times 62.5 \times 2.5 = 11,718\frac{1}{2} \text{ lb.}$$

For practical considerations it would not be advisable to build a dam of this width, with a thickness less than, say 20 in. or 2 ft., although the calculated thickness for this depth of water is much less.

(b) When the water stands 30 ft. above the pavement, the wetted face of the dam is $6 \times 15 = 90$ sq.ft. The center of gravity of this area is its center of figure, which is $30 - 3 = 27$ ft. below the surface of the water. Hence, the total pressure on the dam is now

$$90 \times 62.5 \times 27 = 151,875 \text{ lb.}$$

To calculate the required thickness of the dam, let

t = Thickness of dam (in.);

r = Shorter radius of dam (in.);

w = Width of opening or span (in.);

p = Pressure of water at dam (lb. per sq.in.);

S = Compressive strength of material (lb. per sq.in.)

For a cylindrical dam

$$t = \frac{pw \sqrt{4r - 1}}{4S}$$

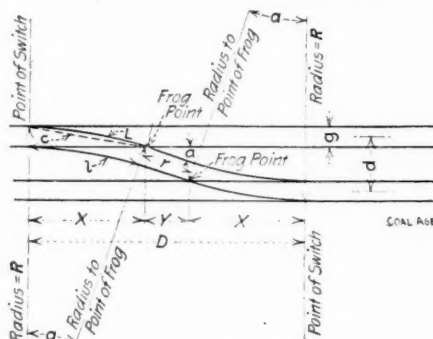
The shorter radius of the dam should

be from $\frac{1}{4}$ to $\frac{1}{3}$ greater than the clear span or width of opening. In this case, r = say 20 ft. (240 in.); $w = 12 \times 15 = 180$ in.; $p = 27 \times 0.434 = 11.718$ lb. per sq.in.; and $S = 600$ lb. per sq.in. Hence, the required thickness of a cylindrical concrete dam to support the given head of water is

$$t = \frac{11.718 \times 180 \sqrt{4 \times 240 - 1}}{4 \times 600} \\ = 27\frac{1}{2}, \text{ say } 30 \text{ in.}$$

CALCULATING A CROSSOVER SWITCH

Ques.—(a) Explain the method and give the necessary formulas for calculating the lengths and distances required to lay a good crossover switch between two parallel tracks in a mine. (b) Find the several dimensions of a crossover switch for a 30-in. track gage when the distance between track centers is 7 ft. and a No. 3 frog is used in each track.



CALCULATING A CROSSOVER SWITCH

Ans.—(a) In considering a crossover switch there is usually, Given,

frog number (n)

track gage (g)

track centers (d)

To find,

chord of lead rail $c = 2ng$

radius of lead rail $R = nc$

frog angle $\sin. \frac{1}{2}a = \frac{1}{2n}$

length of lead rail $L = \frac{a}{180} \pi R$

length of follower $l = \frac{R - g}{R} L$

length of straight track

$$r = \frac{d - g(1 + \cos. a)}{\sin. a}$$

lead of switch $x = R \sin. a$

frog distance apart

$$y = r \cos. a - g \sin. a$$

distance between switches

$$D = 2x + y$$

The letters in the formulas refer to the dimensions specified in the accompanying figure.

(b) When $n = 3$, $g = 30$ in. (2.5 ft.); and $d = 7$ ft.

chord of lead rail

$$c = 2 \times 3 \times 2.5 = 15 \text{ ft.}$$

radius of lead rail

$$R = 3 \times 15 = 45 \text{ ft.}$$

frog angle

$$\sin. \frac{1}{2}a = \frac{1}{2 \times 3} = 0.1666;$$

$$a = 19^\circ 12' = 19.2^\circ$$

$$(\sin. a = 0.3289; \cos. a = 0.9444)$$

length of lead rail

$$L = \frac{19.2}{180} (3.1416 \times 45) = 15.08 \text{ ft.}$$

length of follower

$$l = \frac{45 - 2.5}{45} \times 15.08 = 14.24 \text{ ft.}$$

length of straight track

$$r = \frac{7 - 2.5(1.9444)}{0.3289} = 6.50 \text{ ft.}$$

lead of switch

$$x = 45 \times 0.3289 = 14.8 \text{ ft.}$$

frog distance apart

$$y = 6.5 \times 0.9444 - 2.5 \times 0.3289 = 5.31 \text{ ft.}$$

total length of crossover

$$D = 2 \times 14.8 + 5.31 = 34.91 \text{ ft.}$$

PERCENTAGE OF GAS IN RETURN

Ques.—If, after making due allowance for the expansion of the return air current caused by a rise of temperature and a fall of pressure, the air measurements taken on the intake and return airways still show an increase of 2500 cu.ft. on the return; (a) how is this increase in volume to be explained? (b) what percentage of gas is then contained in the return current when there is 120,000 cu.ft. of air and gas passing.

Ans.—(a) The increase in the volume of the air current is probably due to the mine gases absorbed by the current in its passage through the mine. These gases may and often do consist largely of marsh gas generated in the mine.

(b) The percentage of gas in the return, in this case, is

$$\frac{2500 \times 100}{120,000} = 2.08\%$$

Sociological Department

For the Betterment of Living Conditions in Mining Communities

Housing of Scottish Miners

It has always seemed that those who would prepare for the housing of foreign miners, should know something about the character of the structures to which those miners have been accustomed. The illustrations accompanying this article are taken from the report of J. C. M'Vail, officer of health for Sterling and Dumbarton Counties, which shires are in the narrow waistline of Scotland, between the Firths of Forth and Clyde. The facts herein recorded have the same source.

TWO-ROOM HOUSES PREDOMINATE

It will be noted that all the houses are substantial, being made of brick or stone and roofed with slate, but on some of the older houses red-tile roofs are to be found. The apartments are usually built in long blocks, but greater privacy is secured in these than in the average American miner's double house, because the walls are invariably made of brick. But it will be noted how rarely does one tenant uses more than two rooms. One of these serves as a kitchen and the other as a combination of bedroom and parlor. The latter chamber is termed impressively "the room."

Of 873 miners' houses in the two counties, 2.5 per cent. have one apartment, 84.2 per cent. have two, 11.5 per cent., three, and only 1.8 per cent. have as many as four rooms. It is probable that in the United States as large a proportion of four- and five-roomed miners' houses are to be found as of two-roomed houses in the Lowlands of Scotland.

CHEERFUL APPEARANCE

A long walk, sometimes of concrete, is laid close up to the house fronts and between this and the wagon road is placed a surface channel for drainage. At the back are small outhouses and beyond them small gardens or clothes-drying greens. Sometimes an attempt is made to arrange a cheerful color scheme by making the quoins and arches of the windows and doors with contrasting material. In like manner, the outlines of the blocks and the edges of the chimneys are brought out plainly. This feature is one worthy of comment, because it does not involve any expense and certainly serves to correct the barrack-like appearance of house-blocks.

DAMP-PROOFING

One feature of the Scotch houses is the attempt made to exclude moisture. If

the walls are of stone, they are furred and lathed before plastering, but if they are of brick they are built hollow with an air space of three inches, and the plastering is then placed on the brick. One plan is followed about as frequently as the other. Mr. McVail, however, declares the first one to be the most efficient as a defense against moisture. It is urged that the arrangement of furring and lath-

ing is not as strong as the other, and not suited to houses likely to be occupied by boisterous tenants.

Wherever a wall is made thin to accommodate a clothes press, it is necessary to make it waterproof by lathing and plastering, and at the sides of doors and windows, if the outer and inner divisions of a hollow wall are connected by brickwork, dampness is apt to be admitted from rain beating on the wall. At doors and windows either the hollow must be carried up to the woodwork, or else the brick must be dipped in tar or some other damp-proof compound.

Damp-proof courses are always required, and in obtaining a permit for the erection of a house under the Public Health Act of Scotland, the material and thickness of this course must always be specified. Caithness paving stone is considered desirable for that purpose, but other material is also used. The frequent use of a porous clamp-burned brick made open in texture by admixture of slack coal in the clay before burning and the natural dampness of the British Isles combine to make these precautions necessary.

MODERN CONVENIENCES

All the houses have some species of drainage provision. When fecal matters are not discharged into the sewers, open invert drains are frequently used. These are often made of concrete. These open drains are placed between the walk and the road, and connect eventually with the underground system. Some of them are flushed several times daily by automatic flush tanks.

In 14.5 per cent. of the houses, the sculleries have a clothes boiler, and in 85.5 per cent. there are outside wash-houses. Baths have been provided in 7.9 per cent. of the houses. In 67.5 per cent. an indoor water supply is provided. In 30.2 per cent. of the cases the tenants draw and carry the water from outside pillar wells. In 38.2 per cent. of the houses, water closets are provided, while in 61.8 per cent. of the houses dry closets are in use. In many cases one closet serves for two houses. Dust bins are usually provided for dry refuse, but ash pits are more common. These are roofed to keep out the rain and sun.

THE BED PLACE

Many of the houses have the antiquated Scottish bed places—recesses built in the walls to hold a bed. Fig. 2

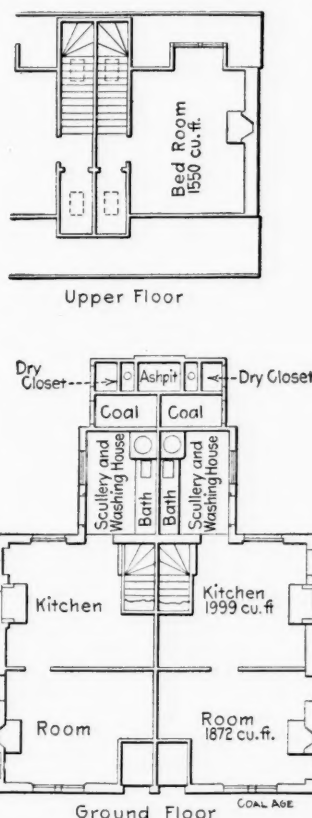


FIG. 1. PRESENT-DAY TYPE OF HOMES OF SCOTCH COLLIERIES

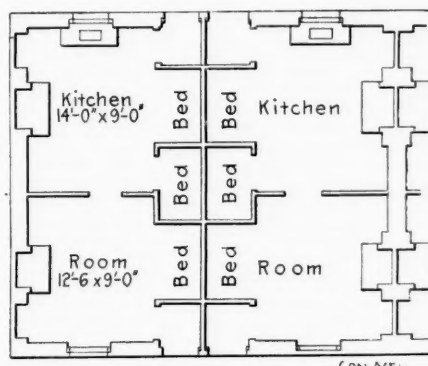


FIG. 2. PLAN OF OLDER TYPES OF MINERS' HOUSE, SCOTLAND

shows such an arrangement. Two bed places are in the kitchen and one in the "room." At one time these bed places were closed in, even more than today. Where such a closet, as in Fig. 2, is used for a bed, the conditions are little better than exist when a box bed is used. Even the most open of set-in bed places are adorned with curtains, which hinder access of air.

To check this fault, the wooden "brow band" at the ceiling is now forbidden. Sometimes to prevent this hanging of curtains, the brick partition between the two kitchen bed places is plastered and not lined with wood. But the provision is ineffectual and the final result is that the plaster is often broken by the driving of nails to hold curtains. Wooden bed boards and "stocks" were formerly as universal as bed places, and did not make for cleanliness, but were apt to harbor vermin if the house was not kept clean. Occasionally a defaulting tenant about to vacate a house, would combine economy with sanitary reform by using the bed boards for firewood, a theft of lumber duplicated in America where yards are fenced in. In planning the houses of some of the newer villages, the owners have acceded to the request to provide iron bedsteads for the bed places. Also, in the "room" there is often now no set-in bed place, but only an iron bedstead in a corner, as in bedrooms of better-class dwellings.

SCULLERIES

As has been seen, the house of two apartments is the standard accommodation for a miner and his family. This is quite a usual size of house for the working classes in general throughout Scotland, but in many modern two-roomed houses a good scullery is provided, which is an important addition to the amenity of the dwelling. Of the 873 houses for which plans have been passed under the building by-laws, 422 are provided with sculleries. These sculleries, if they have a water supply, facilitate the keeping of the kitchen tidy and comfortable as a sitting room and living room.

LIGHT AND VENTILATION

The minimum window area required is one-tenth of the floor space, and under the by-laws, windows are invariably sashed and double hung, so that one-half of the total space is available for ventilation. Care is taken that the window tops reach as near as possible to the ceiling to facilitate ventilation. In rooms where there is no fireplace and chimney, special means of ventilation are required, and this consists almost invariably in a roof ventilator—a circular tube at least six inches in diameter, protected by a cowl. In the kitchen, where there is always a fire, the chimney is, of course, an important aid to ventilation.

In the great majority of two-roomed houses, there is only one entrance—the kitchen door—"the room" being usually directly off the kitchen, so that through ventilation is obtained by means of the kitchen window behind, through the intervening doorway.

The floors of the houses are usually of wood, but sometimes the kitchen floor is paved with brick or concrete. The wood floors are usually ventilated underneath, but not in all the older houses.

CONCLUSIONS

On the whole it may be said that the average miner's house in Scotland is more substantial, and better equipped

no matter what comforts may be offered as a palliation.

The Scotch house has arisen from Scotch conditions, just as the American miner's dwelling has developed from the settler's or the farmer's house. Wood has been cheap in the United States. A large house was, therefore, possible, and is now considered essential. But, as the miners have been started in places remote from cities, all the discomforts of rural life are to be found in miners' dwellings—lack of sanitary conveniences, water obtained from outside wells, pipes and springs—cheap construction, the lack of places for the disposal of garbage and the absence of bathrooms. In time, evolution will give

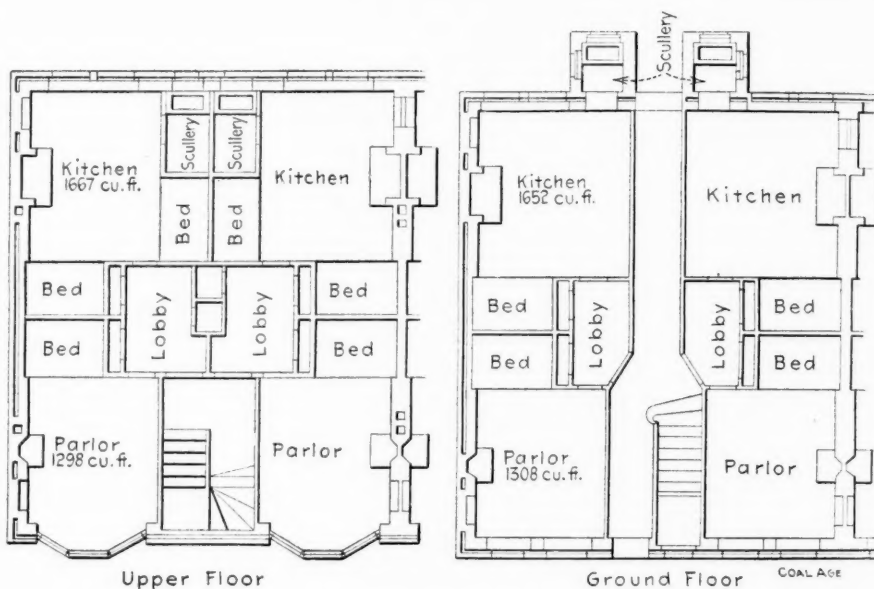


FIG. 3. PART OF A TWO-STORY BLOCK OF HOUSES, DESIGNED FOR SCOTCH MINERS

than in the United States. It supplies, however, quarters too narrow to suit the average American workingman, and it lacks in adequate ventilation. The curtillage accompanying each apartment is severely restricted, for which there is little occasion here, where land is plentiful.

Closing one's eyes resolutely to unfavorable features, one can see a number of points which might well be adopted with advantage. It is certain that the average five-roomed American cottage, too often contains a room devoted solely to an occasional gratification of the family pride. The chromos on the walls and the crayon enlargements on easels in such rooms infrequently gaze on the few honored guests who are privileged to enter, but for the most part rest in undisturbed darkness and stuffiness. It is, perhaps, a folly to plead for a more sensible return to the simple life, because arbitrary demands of society are usually more inexorable than its needs. Granted, however, that five rooms are unneeded, it is a far cry from that to the cabined simplicity of life in a two-roomed house,

us fewer rooms, as the inevitable result of the greater cost of materials. But the miners will have more conveniences as the certain outcome of greater crowding, which permits such betterments, at the same time as it makes them absolutely necessary.

A Tree For Mine Camps

Few trees are better suited for resisting depressant fumes than the sycamore. It has a world wide growth and thrives wherever planted. The sycamore is quite generally found south of the 41st parallel. More northerly the climate seems too rigorous for its growth and even just south of that line, it is not much seen where the elevation is considerable. It has the great advantage of a yearly shedding of its outer bark, and thus where exposed to smoke and noxious fumes it shows itself resistant to these influences and quite hardy. It is found growing in cities like London, England, where the products of the combustion of large quantities of bituminous coal are fatal to most trees.

Coal and Coke News

From Our Own Representatives in Various Important Mining Centers

Washington, D. C.

Judge Martin A. Knapp, of the Commerce Court, appeared on Apr. 15 before the House Committee on Interstate and Foreign Commerce, to explain the terms of the bill drawn up by a subcommittee in conference with himself and Dr. C. P. Neill, commissioners of labor, to extend the terms of the Erdman act to the arbitration of strikes in the coal industry. Judge Knapp explained that the Lee bill, which was originally referred to the committee, has been changed in many particulars.

For one thing, it has been extended to include all classes of railroad employees. The present measure can be applied to not more than one-third of the railroad men. In connection with extending the act to the coal industry, Judge Knapp said that he preferred not to discuss the constitutionality of this provision, in view of his position in the judiciary. However, he explained that since the act is not compulsory, but the invocation of it entirely voluntary on the part of the contending parties, it appears to him that the courts would never be called upon to exercise any power in that connection, and the question of constitutionality would never be brought up.

APPLICATION TO OTHER INDUSTRIES

He was then asked, if the constitutionality of the law will never be questioned, why it should not be extended to all industrial operations, intrastate as well as interstate. The witness said that he believed that the terms of the act should be gradually extended, but that it should be done slowly and the way carefully felt. In the first place, it should be made to embrace those industries which are of the most importance to the welfare of the country. For this reason it was thought well to extend it to the coal industry first. He was then asked if it would be constitutional for Congress to appropriate money to arbitrate industrial disputes which are clearly intrastate. To this Judge Knapp said that it had been noted in the bill that the law could not be invoked except in those cases where the coal went into interstate commerce.

The third important change suggested in the bill was the provision for substituting for the present mediators, a regular board of mediation and conciliation. Judge Knapp said that he and Dr. Neill had no complaint to make, but that the duties of administering the Erdman act, in addition to their regular work, have be-

come extremely heavy, and that inasmuch as it is proposed to extend the terms of the act to other industries, the services of at least one man would be needed all the time. For this reason the bill provides for the creation of the office of Commissioner of Mediation and Arbitration, with a salary of \$7500.

PITTSBURG DISTRICT EXTENDED

In a report in the case of Clyde Coal Co. vs. the Pennsylvania R.R. Co. *et al.* the Interstate Commerce Commission has handed down a verdict in which the present rate on coal from Clyde siding, Fredericktown, Penn., to Ashtabula Harbor, Ohio, when for transshipment by vessel on the Great Lakes to points beyond, is found to be unreasonable to the extent that it exceeds 78c. per net ton, which is the rate ordered by the Commission to be established from the Pittsburgh district to Ashtabula Harbor. The southern boundary of the Pittsburgh district is changed to include complainant's mine.

The opinion of the Commission goes on to say:

There is no evidence that traffic from the Clyde mine to the lake would move through any part of the Connellsville district. A wide area of undeveloped coal lands, probably 60 miles across, separates the Clyde property from the Fairmont district proper, and there is no railroad connecting the two localities. From the facts before us in this proceeding the conclusion is inevitable that the Clyde mine cannot be consistently included within the Fairmont-Connellsville rate group.

In forming the Pittsburgh district, the carriers have followed no hard and fast rule; they have taken in mines more distant from Pittsburgh than the Clyde, and the contour of the district has been materially changed so as to include certain mines and exclude others. All grouping for rate purposes is necessarily more or less arbitrary. Group lines generally have the appearance of injustice to some point just across the line. Yet the line must be drawn somewhere or the grouping abandoned. Once established, groups should not be lightly or unnecessarily disturbed.

We do not think the defendants have justified the eccentric movement of the Pittsburgh district boundary line where it sidesteps complainant's shipping point. We believe that the location of the Clyde mine close to the 30-mile radius from Pittsburgh, its accessibility to one of defendants' assembling points for lake-cargo coal, and other facts before noted, all combine to show that it properly belongs within the Pittsburgh district and is entitled to the rate of 78c. ordered by the Commission to become effective from such district.

Alabama

Birmingham—The Roden Coal Co. claims to have broken all records for coal output in the Cahaba field. At its Marvel mine, the production during March was 28,065 tons with a maximum output of 7400 tons for one week and 1435 tons for a single day. The Roden company has recently secured a year's contract for supplying coal for all vessels of the United Fruit Co., sailing from Mobile and Pensacola, amounting altogether to about 50,000 tons.

It was recently announced by the Woodward Iron Co. that all details of the merger with the Birmingham Coal & Iron Co. have been completed and the consolidation is now in effect. The new company is incorporated in Delaware. No plans for improvements, other than those for the new byproduct ovens and blast furnace, have as yet been announced. By its new acquisitions the Woodward company secures an immense acreage of coal and ore deposits and becomes practically impregnable in the raw material market.

Illinois

Chicago—Union mine workers in Illinois, as in other states of the central competitive field, voted Apr. 10 on the acceptance of the Cleveland wage-scale agreement. A statement received from officials of their organization, urged the men to accept the scale on the ground that it would restore the interstate trade agreement and permit the miners to give their entire attention to the organization of nonunion fields.

A proposed advance of 5 per cent. on the rates of soft coal over the Chicago, Burlington & Quincy from mines in Illinois to Clinton and Lyons, Ia., via Chicago, effective Apr. 25, has been suspended by the Interstate Commerce Commission until Aug. 3.

Assumption—The mine of the Assumption Coal and Mining Co. was damaged recently by a caving in of the surface near the escape shaft. The loss is estimated at \$3000.

Westville—The Bunsen Coal Co. is taking advantage of the suspension to have repairs made wherever they are needed at its different mines. The Bunsen mine No. 4 is receiving a general overhauling. New haulage ropes are being put in, two new cages are being built, a new hoisting drum is to be put in the engine room, two electric motors are to

be installed to haul the coal from the "latches" to the "bottom" and the shakers that have been in use for some time are to be taken out and replaced by new screens.

Danville—Three thousand miners in the coal fields of Danville and vicinity are temporarily idle awaiting the result of the vote on the proposed wage scale. The operators generally are taking advantage of the enforced idleness by cleaning out the mines, and several mines will be fitted out with new machinery during the lull in operations. The installation of new machinery and the cleaning of the mines are practically impossible while work is going on and the lay-off is not regarded entirely in the light of a hardship.

Indiana

Indianapolis—That 90 per cent. of the soft-coal miners throughout the country have approved the proposed two-year wage contract, was announced, Apr. 11, by Edwin Perry, secretary-treasurer of the United Mine Workers, after he had received telegrams from representative locals, reporting results of the referendum vote. The weekly pay question is one which is expected to operate against the agreement in this state. The new contract voted on, says nothing about a weekly pay, but contains a clause which states, in effect, that aside from the increase in pay specifically provided in the contract, there shall be no change in conditions which will add to the cost of production. Operators have insisted that the weekly pay day would add to their cost of operation, as compared with the bi-weekly pay, and some have so notified the miners. Dissatisfaction with this situation, it is believed, will be shown when the official vote in the Indiana fields becomes known, and for this reason the percentage of miners favoring the agreement is expected to be less in Indiana than in Ohio, Illinois and western Pennsylvania.

Clinton—The recent announcement that the Brazil Block Coal Co., which operates mines Nos. 6 and 8, south of Clinton, in the Vermillion County field, would go out of business, has been followed by the information that the mines have been purchased and taken over by the Oak Hill Coal & Mining Co. D. B. Medill, who came to this state after Mr. Deering and his associates and took over the Oak Hill mines, is to be the local head of the seven operations in this field.

Linton—A seam of superior grade coal has been found on leased land between Linton and Pleasantville, in the Green County field, where drilling has been going on for some time. It is understood that four new mines will be opened this year by a local company now forming. Eastern capitalists are financing the deal.

Kansas

Pittsburg—Two new steam shovels have been ordered by the Ellsworth-Klaner Construction Co. for work in stripping the property of the Central Coal & Coke Co., near Weir. It is claimed that the shovels will be the largest in the world. When they arrive, there will be 9 machines of this kind at work in the vicinity of Pittsburg. There are large areas of coal land in this region, passed by in previous mining operations, that are now being stripped.

Kentucky

Louisville—The coal operators and miners of western Kentucky have reached an agreement on a wage scale after numerous conferences. The joint conference committee finally decided to accept the scale adopted at Cleveland, and will meet again at Central City, to approve a number of details referred to a subcommittee. The men insisted, for a time, on an increase in the estimated ratio of lump to mine-run coal produced. Their demand that the operators pay the cost of shotfiring was relinquished. The new scale will give the miners an increase of 5c. a ton for lump coal, 3c. a ton for run-of-mine, and 5.26 per cent. on day wages.

The Pioneer Coal Co., of Louisville, has begun operations at its mine in the Straight Creek district near Pineville. The present output is three cars a day, but this is to be greatly increased.

Providence—The Luton Coal Co. has been making improvements to its plant, installing an air compressor and other mining equipment. It also has additional miners' houses under construction.

Ohio

Steubenville—The sheriff has been asked to appoint deputies to preserve order at the Bradley mines of the United States Coal Co. The company desires to maintain pumpers and track repairmen in the mines during the suspension, but the Italian miners, refusing to permit it, have engaged in several riots and have injured a number of pumpers and others. The men who filed information in court against their assailants were expelled and thrown bodily from the union hall.

Bellaire—Deeds of transfer filed in the Belmont County courts at St. Clairsville, Apr. 9, gave the first intimation of a big deal in eastern Ohio coal lands. The No. 8 Coal Co., stockholders and officers of which are thought to be Pittsburg and Cleveland capitalists, have bought the Belmont Coal Co.'s property, consisting of 8000 acres of coal, three operating mines and valuable surface land. The property is estimated to be worth \$3,500,000. The Lorain Coal & Dock Co. had

arranged to purchase the property a year ago but the final transfer was stopped because some of the land titles were not clear. Since then all titles have been cleared up.

Martins Ferry—Three thousand miners resumed work in Belmont County on Apr. 2. They are employed in the mines of the Etna-Standard and Laughlin plant of the American Sheet & Tin Plate Co. and the Whitaker & Glessner plant of this city. The resumption followed the signing of the scale by the company, on permission of the miners' policy committee. Eight thousand other miners in the county will remain out pending the result of the referendum vote.

Columbus—While no official statement has been given out, it is unofficially announced that more than 90 per cent. of the miners in the Ohio field have voted in favor of the adoption of the new wage contract drafted at the recent joint conference. The official announcement is expected to be made shortly after the middle of the month when operators will start to prepare for resumption of work. Some operators believe that the mines will be in operation by Apr. 22, but the majority believe that little coal will be mined in Ohio before May 1.

Cleveland—Contracts for transporting 750,000 tons of coal to Lake Superior points were recently distributed among Cleveland vessel managers. The contracts provide for an increase of 25 per cent. of the tonnage, if the shipper desires, by the middle of the summer. The freight rate is 30c. a ton. Independently of arrangements that have been made for floating large amounts of coal, for which contracts have not been signed here, there have been awarded independent vessel managers more than 2,000,000 tons of coal at last year's rates.

Pennsylvania

BITUMINOUS

Pittsburg—District No. 5, United Mine Workers, voted, Apr. 11, overwhelmingly in favor of the Cleveland wage settlements. Demands which miners of western Pennsylvania will make upon the operators were formulated at the convention on Apr. 12. Operators and miners of the Pittsburg district will meet in joint conference to reach an agreement for this field. The agreement will be based on the demands approved Apr. 12 and the basis for the wage contracts reached at the interstate joint conference in Cleveland. Among the more important demands for the local field are:

Abolishing machines in extracting ribs and stumps; uniform outside day wage scale; uniform scale for slate and dead work; complete check-off for the organization for all men working in or about the mines; house rent and the price of

house coal to remain the same and not be increased because the men's wages are increased; rent to be \$1 a room a month and house coal \$1 a ton; no discrimination against miners for refusal to patronize company stores; where a miner is discharged or forced to remain idle through a dispute with the company, and is afterward found to have been unjustly dealt with, he is to be reinstated and paid for lost time.

California—In the face of the stand taken by the miners of District No. 5 in their convention at Pittsburg, when they agreed to remain idle until Apr. 22, Vesta No. 4, the largest mine in the district, resumed operations Apr. 11.

Washington—Options on about 800 acres of the Pittsburg vein of coal underlying several farms on the southern border of this city have been taken by C. T. Bartlett, of Washington, and the deal is expected to result in the opening of a coal mine just over the borough line. Mr. Bartlett is reported to have optioned the coal at \$300 an acre.

Du Bois—The operators' association of District No. 2, United Mine Workers, took a decided stand in the joint scale conference, Apr. 10, practically refusing the scale presented by the miners and offering a renewal of the previous wage agreement for two years. In the event of this counter proposition not being acceptable to the men, the operators proposed to submit the matter to arbitration.

Johnstown—Preliminary surveys have been made and a definite route is now being mapped out for an extension of the Windber-South Fork branch of the Pennsylvania R.R. into the Shade township coal fields in Somerset County. Several local coal firms are interested in the project as they own big holdings in that field. The route will branch off the Windber-South Fork tracks at a point below Arrow. It will follow the general direction of Shade Creek and will be routed toward Central City. The extension will open for the Pennsylvania R.R., the basin in which the Shade field is situated, as far south as Berlin, an airline distance of from 25 to 30 miles.

ANTHRACITE

Scranton—The colliery railroad lines of the Mount Jessup, Moosic Mountain and Dolph Coal Companies, independent operations at Jessup, near here, were put temporarily out of commission by a dynamite explosion on a cross-over of the railroads, Apr. 11. Sticks of dynamite were found under the rails of an Erie Railroad mine switch for a distance of 100 ft., and if they had not been found, a train crew would probably have been blown up. On Apr. 13, the Dolph company's pump runners, firemen, engineers and repairmen, who have worked during the suspension, were attacked by a crowd of nearly 100 men. The rioting is attributed by the miners' union, the colliery owners and the

sheriff to a branch of the Industrial Workers of the World that has been flourishing in Jessup for several years.

Thirteen damage suits were started recently against the Price-Pancoast Coal Co. by families of victims of the Pancoast mine disaster of Apr. 7, 1911. In three of the actions \$50,000 is the measure of damages fixed and in the other cases the amounts vary from \$20,000 to \$30,000.

The average price at New York for domestic sizes of anthracite coal for March has been determined by Commissioner Neill as \$4.88. This price entitles the mine workers to an increase of 7 per cent. on the rates of wages fixed in the award of the anthracite strike commission. In the last 12 months the average monthly bonus to mine workers under the sliding scale has been about 4½ per cent.

Wilkes-Barre—The anthracite coal companies of the Wyoming region offer no encouragement to large coal consumers that the suspension of work at the mines will be of short duration. The Delaware & Hudson Co. recently notified the officials of the Sheldon Axle Works that if they wanted more coal they had better place their order at once.

The Prospect colliery of the Lehigh Valley Coal Co., located in Wilkes-Barre, claims the world's record for a month's production of anthracite coal. It turned out 104,000 tons during March.

Fires continue to be drawn from under the boilers and mules taken out of the mines in this region, which many think is a sure indication that the suspension of work will last longer than first expected.

Shamokin—Orders from union headquarters have called off all repair work in this district after Apr. 10. There will be no interference with the pumpmen and workmen needed to prevent damage to property until after the result of the conference at Philadelphia becomes known, when it is intended to suspend everything if an agreement is not reached. The union heads claim that some companies were taking advantage of the permission granted to do repair work to prosecute new work, which led to the order being issued.

Philadelphia—Conferences of anthracite operators and miners were opened here, Apr. 10. Representatives of the miners declined the offer of Mr. Baer, on behalf of the operators, to submit the controversy to a board of arbitration, and the whole matter in dispute was referred to a committee of four operators and four miners. So far no definite results of their deliberations have been made public, but an optimistic feeling seems to prevail to the effect that a satisfactory settlement will be reached.

Virginia

Pocahontas—The Panama R.R. Co. has awarded the contract for 2 years' supply of coal at the Panama Canal to the Pocahontas Fuel Co. The contract calls for the delivery of as much as 550,000 tons a year at \$2.70 a gross ton, with a reduction of 5c. a ton should the price of coal decline during the second year.

West Virginia

Fairmont—Several large mining companies, employing nonunion labor, have announced an increase in the wages of their employees. The companies making the advance are the Consolidation Coal Co., the Davis Coal & Coke Co. and the Black-Sheridan-Wilson Co. In all about 15,000 men are affected. These companies are considered to have always treated their employees liberally, and have few labor difficulties in their respective fields.

Fayetteville—Extra police have been placed in the mining communities of Boomer, Cannelton and Marting, where race riots are feared between American and Italian miners. Feeling runs high following the murder of a bank boss of the Boomer Coal Co., who was followed to a stable by three Italian miners and shot down in cold blood. Governor Glasscock was asked to have the militia in readiness to be sent there. All the mines are idle pending the decision on the referendum vote on the Cleveland agreement.

Moundsville—When non-union men were leaving the Mound City coal mine, Apr. 9, they were attacked by a mob of 400 union miners armed with guns and clubs. Two were probably fatally injured and several others seriously injured. A riot call was sent in and the sheriff with a posse of 100 deputies, rushed to the shaft of the mine and charged the mob. Six deputies were injured in the mêlée. The company has applied to United States Judge A. G. Dayton for an injunction against interference by the strikers.

Bohemia

Karlsbad—The strike in the Bohemian coal fields, which was ordered at the same time as the British strike, came to an end Apr. 3 when the mine owners gave the miners guarantees of wage increases, although the men will not get the full 15 per cent. demanded.

Spain

Madrid—A commission representing the mine owners has not been able to reach an agreement with Premier Canalejas on the threatened strike of the coal miners. The miners in the Asturias region, failing to receive an increase of 10 per cent. in their wages, threaten to strike.

Personals

J. M. Fitzgerald, the recently elected president of the Davis Coal & Coke Co., was in Baltimore last week, after having completed a trip over the company's properties in West Virginia.

W. J. Finnegan has resigned as secretary of the Central City Coal & Iron Co., with offices in Louisville, to become general sales agent and assistant manager of the Louisville Coal & Coke Co.

J. W. McNeill, marine clerk in the offices of the Davis Coal & Coke Co., will go to New York as chief clerk to President Fitzgerald. C. C. Knobloch will fill the position formerly held by Mr. McNeill.

George Watkin Evans has recently resigned his position as chief of coal surveys for the Washington Geological Survey, and has opened an office in Seattle as consulting mining geologist and engineer, specializing in coal.

C. S. Bookwalter, of Paducah, Ky., has been elected general manager and treasurer of a new company which has been organized to take over the property of the old Carbondale Coal & Coke Co., with mines at Hamby, Ky.

E. N. Zern, assistant professor of coal mining at the University of Pittsburg, has been elected professor of coal mining by the board of regents of the University of West Virginia to fill a position created by the recent establishment of a school of mining at this institution.

C. T. Fairburn, general manager of the southern district of the Republic Iron & Steel Co., has withdrawn from the executive committee of the Alabama Coal Operators' Association, and has been succeeded by A. H. Woodward, of Birmingham, general manager of the Woodward Iron Co.

E. M. Wadsworth, dean of the mining department, University of Pittsburg, has retired and S. A. Taylor, president of the American Mining Congress, has been elected to fill the vacancy. Mr. Wadsworth will receive a pension from the university and will probably devote a portion of his time to its affairs.

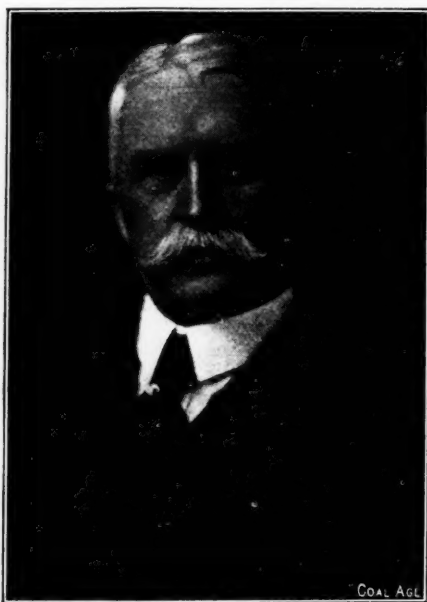
John F. Meagher, of Mulga, Ala., general superintendent of coal mines for the Birmingham Coal & Iron Co., has been appointed assistant general superintendent of coal mines for the Tennessee Coal, Iron & R.R. Co., with headquarters at Ensley, Ala. Mr. Meagher will assume his new duties at once.

Edwin Ball, of Birmingham, Ala., manager of ore mines and quarries for the Tennessee Coal, Iron & R.R. Co., has been appointed general superintendent of all the company's mines, following the resignation of Edward H. Cox, general superintendent of coal mines and coke ovens. Mr. Cox will remain with the company until about June 1.

Obituary

William A. Lathrop, president of the Lehigh Coal & Navigation Co., and Lehigh & New England R.R., one of the foremost men in American mining circles, died Friday morning, Apr. 12, at the City Hospital, Wilkes-Barre, Penn., following an operation for appendicitis. His condition had been critical for several days, and a number of specialists had been summoned to his bedside.

Mr. Lathrop was 58 years old. He was born in Springville, Susquehanna County, Penn., and acquired his earlier education at the schools of this town. Later, he entered Lehigh University, and in 1875 was graduated with honors as a civil engineer. He afterward took a course in mining and received his degree



WILLIAM A. LATHROP

of mining engineer from the same institution.

For two or three years after his graduation Mr. Lathrop was employed in various minor capacities, both in the anthracite mines and on railroad work in the Wyoming and Lehigh districts of Pennsylvania. He subsequently became assistant to Robert H. Sayre, chief engineer of the Lehigh Valley, and filled this position with great credit for several years. Later, he was associated with Major Irving A. Stearns, of Wilkes-Barre, and for a time took over the management of an iron-mining enterprise in northern New Jersey.

In 1881, when the Southwest Virginia Coal Co. required a superintendent and mining engineer to open up its properties in southwestern Virginia, Mr. Lathrop was selected for the position. He started the mines which have since become the center of the Pocahontas field, and laid out and built the present town of Pocahontas.

After several years of labor against great difficulties in this pioneer work in

Virginia, he returned to Pennsylvania in charge of the bituminous mines of the Lehigh Valley Coal Co., at Snowshoe, in Center County, and in 1888 was made superintendent and general manager of all the Lehigh Valley mining operations, succeeding the late Frederick Mercur. Mr. Lathrop remained at Wilkes-Barre in this capacity until 1902, when he resigned to take the presidency of the Webster Coal & Coke Co., operating in central Pennsylvania, and later was made president of the Pennsylvania Coal & Coke Co. When this company leased its mines and lands to other interests, he became president of the Lehigh Coal & Navigation Co., with headquarters in Philadelphia, succeeding Lewis A. Riley.

Mr. Lathrop was a member of the state commission, appointed by Governor Tener, a few months ago, to devise a plan for the protection of the surface of the anthracite region from damage by mine caves. He was a trustee of Lehigh University, president of several coal companies, a director of the People's Bank, of Wilkes-Barre, and of the Fourth National Bank, of Philadelphia, a member of the American Institute of Mining Engineers, the Mining and Metallurgical Society, the Union League, University, Art and Downtown clubs, of Philadelphia, the Westmoreland Club, of Wilkes-Barre, the Railroad Club, of New York, and the Pennsylvania Society of Sons of the Revolution. Although in recent years much of his time was spent in Philadelphia, Mr. Lathrop made his home at Dorranceton, near Wilkes-Barre, Penn. He is survived by his wife and one daughter.

Construction News

Birmingham, Ala.—Plans are being prepared by the Corona Coal Co. for improvements to its property at Corona and elsewhere, involving an expenditure of about \$300,000.

Zanesville, Ohio.—R. P. Dutro, of Crooksville, has leased 300 acres of coal land in Perry County and will develop the property by opening a mine some time this summer.

Louisville, Ky.—The Perry County Coal Co., which has been organized by Cincinnati interests, will begin mining operations at Viper, Ky. A mine is to be opened in the immediate future.

Wilkes-Barre, Penn.—The contract for building a new breaker to replace the Palne breaker, which was burned down some time ago, has been awarded to W. L. Moore, of Luzerne. Work will be started at once.

Louisville, Ky.—The Consolidation Coal Co., of Baltimore, Md., has awarded a contract for the construction of 1000 buildings at the new town of McRoberts, Ky., to the Nicola Construction Co., of Pittsburg. Work is in progress.

Charleston, W. Va.—The Kimball Pocahontas Coal Co., of Kimball, W. Va., has been incorporated, with \$100,000 capital, to operate in the Brown's Creek district of McDowell County. H. D. Hatfield, Eckman, W. Va., is one of the incorporators.

Coal Trade Reviews

Current Prices of Coal and Coke and Market Conditions in the Important Centers

General Review

While there has been no further recession in prices, the coal market is undoubtedly at a complete standstill. This is due to the unexpectedly short duration of the bituminous suspension, the heavy stocking and the general belief that a further decline in prices is inevitable. Most of the large consumers and dealers were prepared for a protracted shutdown at the mines, with the result that the former are showing no disposition to buy, while the latter are anxiously seeking a market for their product, acquired in many instances at a high figure.

In the East there is little or no business being done in the open market, the movement being confined almost entirely to contracts. With the bituminous agreements settled, interest is now centered on the anthracite conferences, and it is believed that a resumption at the hard-coal mines will not be effected before May 15. While quotations have eased off in some sections, there is so much high-priced coal on hand that wholesalers are making every effort to hold the market at the present high level. There is considerable activity in the Pittsburgh coke market, in which the suspension over the Easter holidays developed a temporary but pronounced shortage.

A general holiday is in effect in the Ohio trade, there being but few arrivals, which are selling at a low figure. The suspension has resulted in the consumers using up much of their surplus coal, which, together with the shortage in the Northwest, has engendered a strong feeling of optimism over the outlook.

In the Middle West the trade generally is dull and quiet, while at Chicago heavy tonnages which accumulated on demurrage, were forced on the market and caused a ruinous slump in prices. Rumors of a possible strike in the Far West next fall have had a stimulating effect on the markets there.

Boston, Mass.

The week has shown a sagging market, with bituminous easing off to nearly normal prices, and anthracite bringing much reduced premiums. This, in the face of no supplies on hand, and a partial suspension at the soft-coal mines, shows the extent to which buyers are waiting. Shipments from the Georges Creek field have narrowed the demand for the Pennsyl-

vanias, and quotations on the latter vary according to the anxiety of the shippers to sell. There is little present interest in bituminous, more than enough to carry over into June, when everybody is predicting an easy market, both as to coal and freights.

The loading situation on Pocahontas and New River, at Hampton Roads, is not clearing as fast as was expected; boats are still taking two weeks and more to load. The agencies are apparently waiting for the market to settle down before attempting to contract for the new year. Efforts in that direction seem to be confined entirely to shippers of Georges Creek.

In anthracite the trade is at a complete standstill. The companies are cleaning up loose ends of stock here and there, while the available supply of new arrivals has practically disappeared. Quotations are off considerably from what they were, and there appears to be a feeling that the suspension will only be of short duration. The reports of the conferences are followed here with much interest.

Soft coal all-rail is slow again; the volume of speculative shipments was so large that the consumers are well satisfied with the situation at present. Prices have been forced down to nearly normal for the cheaper grades, and there has been no difficulty in obtaining consignments of arrivals at the transfer points.

Freights are much easier. Dollar freights from Hampton Roads to Boston are in sight, and in Reading transportation from Philadelphia the rate had been put down to about \$1.20@1.

Current prices are as follows:

Clearfield, f.o.b. mines.....	\$1.50@1.25
Clearfield, f.o.b. Philadelphia..	2.75@2.50
Pocahontas, New River, f.o.b.	
Hampton Roads	3.25@3.85
Georges Creek, f.o.b. Baltimore	2.80@2.95
Georges Creek, f.o.b. Philadelphia	2.87@3.05

New York

The situation in the New York market continues unchanged. The trade is apparently undergoing a period of readjustment, made necessary by the unexpectedly short duration of the suspension in the bituminous fields. Interest is now centered entirely on the anthracite conferences being held in this city, and should these not result in an agreement, it is probable there will be a renewed activity in trade circles. A shortage in anthracite will materially effect the bitumin-

ous consumption, so that progress of negotiations is being keenly followed by both branches.

In bituminous the arrivals are good, and the trade is quiet, with only a few transactions being recorded. There appear to be large tonnages of the low-grade fuels on the market, and these are exerting a depressing influence on prices, which are now quoted around \$3, f.o.b. Mines shipping this market are working under a fair to normal capacity. The railroad movement is good, and while the dealers are short in supplies, the consumers generally are well stocked.

The anthracite trade is at a complete standstill, with nothing coming in and little or no demand. An acute shortage developed in rice, while supplies generally are estimated at less than one-tenth normal.

Current wholesale quotations here are as follows, per ton:

Broken	\$5.00@5.25
Egg	5.00@5.25
Stove	5.50@5.75
Nut	5.20@5.50
Pea	3.75@4.25
Buckwheat	3.50@4.00
Rice	2.50@3.25
Barley	1.90@2.25

Philadelphia, Penn.

The trade in this vicinity is about the same as last week, which is not saying a great deal, as the very optimistic reports that the newspapers are making about a favorable settlement of the trouble between the operators and miners, is causing householders generally to postpone any purchases of coal unless absolutely necessary. The dealers are fairly well stocked, that is, with the domestic sizes of coal, but declare that business is exceedingly poor.

No coal is being sent to market, and there is nothing offering with the exception of some that is in the hands of speculators, who are asking, but in very few cases receiving, exorbitant prices. As a whole, the consumers are fairly well supplied with fuel, and with the coming of warm weather, when most fires will be drawn, are loth to worry about the situation. It is still in doubt what the final outcome of the difficulty will be, and what the adjustment, if any, will amount to. It is believed the two most important items of the miners' demands, recognition of the union and increased wages, are the stumbling blocks, and it almost goes without saying that an increase in the scale of wages will bring about an addition to the prevailing prices for coal.

Already it is rumored that stove size is likely to be put on a parity with chestnut, or in other words, an advance of 25c. over last year, but the wholesale operators neither confirm nor deny this, taking refuge in the statement that present prices, or the March circular, will prevail, until some adjustment of the trouble is brought about. Predictions are freely made that it looks now as though it would be the middle of May before resumption of mining.

Pittsburg

Bituminous—There has been practically no coal market the past week. The operators have no coal to sell and consumers are fairly well provided, having as a rule laid in larger stocks than necessary to tide them over the suspension, which proves unexpectedly short. While official warrant is not yet available, it is expected the mines will resume next Monday, as presaged in last week's report.

The Lake shipping season will open May 1, when the new rate of 78c. on cargo coal to the lakes goes into effect, against the old rate of 88c. Many contracts will probably have been closed before that time, but operators do not admit that any have been made thus far. Expectations are for a much better movement this year than last, as last year's movement was light and the hard winter cleaned up stocks in the Northwest very thoroughly. The Pittsburg district does not, however, expect to obtain a much larger percentage of the total business than in the past couple years.

Connellsville Coke—Coke has been higher the past week, partly on account of increased production cost through the advance in wages and partly through decreased production owing to celebration of the Easter holidays. It is estimated that last week's production was about 60 per cent. of normal, production in the first two days being not over 30 per cent. of normal, while the two days following was somewhat low also.

Very little coke has moved, but \$2.75 and \$2.85 has been freely paid for small prompt lots, while occasionally a few carloads brought still higher prices, when the seller could assure spot shipments by giving car at the time of making sale. There is no market on contract furnace coke, neither buyers nor sellers having gotten down to business. There is little contract business to be closed for second quarter, but a considerable tonnage runs out July 1. We quote: Prompt furnace, \$2.75@3; prompt foundry, \$3@3.25; contract foundry, \$2.65@2.75.

The *Courier* reports production in the Connellsville and lower Connellsville region in the week ending Apr. 6 at 415,464 tons, an increase of 2000 tons, and shipments at 4339 cars to Pittsburg, 6605 cars to points West and 1370 cars to

points East, a total of 12,314 cars, a decrease of 136 cars; shipments East, however, increased 300 cars.

Baltimore, Md.

The Baltimore market eased off considerably during the past week, prices being lower and the demand less active than heretofore. This is due to the fact that many consumers stocked up to protect themselves, and that they now find a goodly supply on hand, with little possibility of a serious tie-up in either the anthracite or bituminous fields. The few who decided to take chances in the market in the event of a strike, are apparently not doing any buying, they believing that prices will go much lower than they are at present.

One large operator declared that, so far as his company was concerned, he found it difficult to sell coal at the prices which prevailed before the undue activity set in, as the result of strike conditions abroad and the unrest in labor circles here. At the present time, there is a large amount of coal in the market, and shipments are being made with the greatest dispatch. The car supply is adequate.

Buffalo, N. Y.

The market is very quiet here and this is likely to continue for some time or at least till an understanding is reached with the miners. So little progress has been made in that direction as yet that it is impossible to make any prediction as to when business will return to normal.

There is just enough bituminous production to bring prices down close to last winter's figures. Some incautious operators and jobbers have found themselves with considerable coal on hand for which there is no market and more or less car service has been paid. One successful operator, however, reports that he is still getting about 20c. a ton more for his present small output than he was able to get last winter and he is satisfied, though it does not appear that many are doing as well.

Quotations are not much easier to make than they were last week, for prices, though lower, are not at all uniform. One dealer ridicules the prices that another claims to be getting. It is at least agreed that slack and coke are very strong and much higher than they were a year ago. There is no slack making for the lake trade and the coke regions are very short of men, so both should be strong for some time yet.

Nearly former quotations of bituminous are still in effect as follows: \$2.60 for Pittsburg three-quarters, \$2.50 for mine-run and \$2.25 for slack, with coke up to \$4.75 for best Connellsville foundry. Allegheny Valley coal is commonly about 25c. lower than Pittsburg, though the difference is not so closely maintained as it sometimes is.

There is next to nothing doing in anthracite. Shippers are getting a few cars now and then and the few consumers who are in the market are taking it at full prices, or at a premium in case of independent stores. The predictions that mining would be resumed soon after the middle of April are not heard now. Not a few coal men are now looking for an obstinate strike before the differences are settled.

Cleveland, Ohio

A general holiday has been in effect during the past week in coal trade. A few straggling cars of coal have come into this market but there was considerable difficulty in disposing of it at any price; fortunately however, the quantities were small, as no doubt this coal was purchased at a high rate just prior to the suspension. At this moment every indication points to the miners going to work in the next week; fully 90% of the men have accepted the two-year scale, proposed by the Cleveland conference of miners and operators, and reports show that work will soon be resumed at the mines.

According to the operators, 1912 promises to be a banner year in the lake trade, owing to the unprecedented cold weather in the North last winter. It is said that every pound of coal at the upper lakes has been disposed of, and with the docks pretty well cleaned up, operations in this trade will start briskly as soon as it is known definitely that the lakes are free from ice.

There seems to be a much better feeling shown throughout the country, and operators and jobbers are expecting quite a business revival the coming year. Up to the present there has not been any shortage of coal reported by manufacturers or others, as everybody stocked up in anticipation of a suspension, and it is not expected that there will be any great demand for at least two weeks.

There is very little demand for domestic, as the season for that grade is about over. At present no prices are being quoted owing to the uncertainty, but established prices will probably be made during the week.

Columbus, Ohio

The coal market in Ohio during the past week has been at a standstill. The trade has been waiting the announcement of the result of the referendum vote of the United Mine Workers of America on the wage-scale matter, and unofficial reports show that it has been carried but it will be at least a week and possibly two weeks before the mines in the Ohio fields are again running.

In the meantime, steam users are consuming their surpluses, stored in preparation for the suspension. There is no report of suffering or great inconvenience in any quarter and the supply will un-

doubtedly be ample to last until mines have resumed. Many of the railroad companies have thousands of tons stored, sufficient to last several months.

There are bright prospects for a large Lake trade, as practically no stocks will be carried over in the Northwest. There are also good indications for an active steam business, since there will be little in storage at the beginning of May. The general tone of the market is satisfactory, and operators are looking forward to a good year. It is believed that prices will be somewhat stiffer during the summer than was the case last year.

Operators are taking advantage of the suspension to prepare their mines for the renewed activity when the wage matter is finally settled. A number of new mines will be opened in the Ohio fields, and preparations are being made for an increased output.

One of the features of the trade which will be given attention soon is the domestic demand. Stocks in this branch are generally small, and the stocking season is expected to produce a good demand for the larger sizes. Dealers are already placing their yards in shape for the opening of the stocking season.

Prices which can be said to prevail in Ohio fields are:

<i>Hocking Valley</i>	
Domestic lump	\$1.50
3-in.	1.35
Mine-run	1.15
Nut	1.20
Nut, pea and slack	0.85
Coarse slack	0.65

<i>Pittsburg No. 8</i>	
3-in.	\$1.05
Mine-run	1.15
Coarse slack	0.75

<i>Pomeroy Bend</i>	
Domestic lump	\$1.55
3-in.	1.35
Nut	1.25
Mine-run	1.15
Nut, pea and slack	0.80
Coarse slack	0.70

<i>Kanawha</i>	
Domestic lump	\$1.50
3-in.	1.30
Mine-run	1.10
Nut, pea and slack	0.80
Coarse slack	0.70

Nashville, Tenn.

The market in the west Kentucky field is in a very healthy condition. This is accounted for by the fact that the union fields have not definitely arrived at a basis of settlement yet, and there seems to be quite an uncertainty as to when they will do so.

The L. & N. R. R. are taking quite a tonnage of coal from all the mines. In view of the fact that the union mines are not working, it is giving the nonunion quite a heavy tonnage which they are very glad indeed to have, as business would naturally be a little quiet if it were not for this, although there is a fair demand for steam coal.

Domestic business is practically dead, and it is almost impossible to move any lump coal; consequently there is a very small amount of screenings being pro-

duced and the demand for them, as well as the prices offered, are very much greater than has ever been known in this section. Some of the steam plants that are dependent upon screenings, on account of their stokers, are crushing mine-run at an enormous expense. The indications are that prices will be a little better the coming season.

Chicago

The recent disturbances in the coal-mining situation have resulted in a difference of 35 to 60c. between the spot and mine prices on all kinds of steam coal; the average is probably close to 50 cents.

Large shipments have arrived at Chicago, and a very substantial amount has accumulated on demurrage. By forcing this coal on the market, prices have been brought down to from 90c. to \$1 a ton, below the price paid by the middleman.

There is no particular demand for smokeless lump and egg, and the price is \$1.50 at the mines. It has been the experience of dealers that anything on track, with the exception of smokeless mine-run, had to be sacrificed in order to move it. It is understood that the Lake shipping interests will soon reach a decision that the market warrants a price about 10c. a ton over that of last year.

Prevailing prices at Chicago are:

<i>Sullivan County:</i>	
Domestic lump	\$2.37@2.62
Steam lump	2.17@2.27
Screenings	1.72@1.77

<i>Springfield:</i>	
Domestic lump	\$2.32@2.57
Steam lump	2.02@2.22
Mine-run	1.92@2.02
Screenings	1.67@1.72

<i>Clinton:</i>	
Domestic lump	\$2.27@2.52
Steam lump	2.07@2.17
Mine-run	1.87@1.97
Screenings	1.62@1.67

<i>Pocahontas and New River:</i>	
Mine-run	\$3.15
Lump and egg	3.55

Coke—Prices asked for coke are: Connellsville and Wise County, \$4.85; by-product, egg and stove, \$4.80; byproduct, nut, \$4.50; gas-house, \$4.85.

Indianapolis

The coal trade in this state is almost at a standstill, owing to the mines, with few exceptions, being closed. The suspension of work is delaying the dealers here and in other cities from the putting into effect of the summer schedule, which averages about 10% less than the winter. The reduction usually comes in April, but owing to the fact that the greater part of this month will be gone before an agreement between the miners and operators can be ratified, there is little chance of the summer rates going into effect until next month, and perhaps later. It is pointed out that the retail dealer has on hand the higher priced coal bought during March, and until the

mines open and a reduction is made there is no inducement to summer buyers.

The 5 cents on the ton allowed in the new agreement, even if ratified, is not expected to affect summer prices to any great extent. A number of towns and cities in the state are face to face with a coal famine. In order to avoid closing down factories, the suspension of mining cannot be terminated any too soon.

St. Louis, Mo.

There is no business at all in the St. Louis market, and there is still a considerable tonnage of coal held on track at the mines, while some of the operators on the Illinois Central who stored coal on the ground are now loading it on cars, but there is practically no demand. There is nothing to gage prices by, as the operator will take anything that is offered.

Indications are that the mines will not resume operations now before the first of the month, and possibly not then. There is a small tonnage of smokeless moving in, but it is in excess of the demand, and coke is moving very slowly. There is nothing to indicate that conditions will improve for the next 10 days, as the stock of coal in storage is ample to take care of requirements for practically 30 days yet.

Spokane, Wash.

A general tie-up in the coal fields of Western United States is threatening Washington, Montana, Wyoming and Colorado, according to statements made by local dealers at Spokane. The agreements between the miners and the operators of this district will expire in the summer and the fall, and there seems to be ground for the belief that it will not be possible to effect a settlement. According to E. F. Waggoner, of the Union Fuel & Ice Co., the wages paid by the operators in this territory is the highest mining scale in the United States, and it is believed by nearly everyone that the scale should be reduced. However, the entire situation will depend upon the outcome of the strike in the East.

Although the dealers are laying in a good supply in case a strike does come, they have not changed their prices since last November.

San Francisco

The arrivals of coal by sea for March totalled 41,390 tons, of which 31,402 tons were foreign, viz., 30,372 tons were from British Columbia and 1030 tons from Australia. The balance consisted of one cargo, 5160 tons, of Pocahontas for the U. S. Navy, and two cargoes, 4829 tons of steam coal, from Seattle, for bunkering the navy's coast steamers at this port.

As a whole, the stock situation has materially improved during the past month. Of the British Columbia product, some

25,000 tons only are available for this market, one cargo of over 5000 tons being for transshipment to Alaska. With but 1030 tons of Australian coming in, considerable inroad was made on the supplies, and with but 11,000 tons afloat, delivery of which will be spread over the next three months, there will be none too much of this fuel in the market.

The supply of Rocky Mountain coal has been fairly good, but the dealers are loath to buy except from hand to mouth, since on May 1 a reduction of 50c. per ton off the mine price will come into force. During the past week there has been little, if any, change in the movement of coal. The weather has been mild, and consequently demand for house fuel has been light.

Current rates to the trade are as follows, per ton:

Wellington (British Columbia)...	\$8.00
Pelau Main (Australian).....	8.00
Rocky Mountain.....	8.50
Cumberland.....	12.50
Anthracite (Pennsylvania).....	15.00

Production and Transportation Statistics

CHESAPEAKE & OHIO RY.

The following is a statement of the coal and coke traffic over the lines of the C. & O. Ry. for February and eight months ended Feb. 29, 1912, in short tons:

De tination	February	8 Months
Tidewater.....	299,459	2,605,213
East.....	190,655	1,477,771
West.....	971,116	7,451,907
Total.....	1,461,530	11,534,891
Coke.....	17,180	135,240

From Connections

Bituminous.....	17,650	153,890
Anthracite.....	4,742	26,646

NORFOLK & WESTERN RY.

The following is a statement of commercial and company coal from mines in the N. & W. Ry. for the month of March, in short tons:

Field	Commercial	Company
Pocahontas.....	1,061,465	99,501
Tug River.....	141,582	42,665
Thacker.....	186,395	57,971
Kenova.....	62,018	8,316
Clinch Valley.....	116,581	9,265
Total.....	1,568,041	217,718

The following is a statement of the coal and coke tonnage from mines on the N. & W. Ry. in the State of West Virginia, for the month of March, 1912:

From	Tippie Coal	Total Coal
Pocahontas.....	20,344	1,112,468
Tug River.....	3,378	184,247
Thacker.....	5,176	244,366
Kenova.....	6,279	70,334
Total.....	35,177	1,611,415

Note—Total shipments of coke, originating entirely in the Pocahontas field amounted to 128,816 tons.

IMPORTS

Imports of coal into the United States for February, 1912, totaled 118,921 tons as compared with 133,051 tons for the same month last year. The imports were

almost entirely bituminous and 111,669 tons came from Canada, Australia and Tasmania being the next in importance with 6256 tons.

VARIOUS RAILROADS, RIVERS AND CANALS

The following is a comparative statement of the fuel movement on various railroads, rivers and canals for January, 1911-12:

Railroads	1911	1912
Baltimore & Ohio ²	2,885,330	3,078,209
Buffalo, Rochester & Pittsburgh ³	692,440	755,436
Buffalo & Susquehanna ³	174,685	174,358
Chesapeake & Ohio ²	1,530,710	1,548,881
Huntingdon & Broadtop Mountain ²	108,481	99,612
New York Central & Hudson River ³	770,438	769,730
Norfolk & Western ²	1,705,256	1,819,588
Pennsylvania (east of Pittsburgh & Erie) ²	5,569,804	5,562,831
Pittsburg & Lake Erie ²	1,088,198	1,415,301
Pittsburg, Shawmut & Northern ²	139,017	165,338
Southern ⁴	358,917	328,257
Virginian ²	218,308	306,766
Western Maryland.....	286,795	215,973

Rivers and Canals

Barren River, Lock No. 1.....	182	80
Black Warrior River, Lock No. 12.....	135	426
Canals and Falls at Louisville.....	233,699	42,530
Chesapeake & Delaware Canal.....	10,956	6,101
Davis Island Dam.....	574,170	46,925
Green River, Lock No. 1.....	2,928	1,431
Kanawha River.....	146,460	28,880
Kentucky River, Lock No. 1.....	12,600	3,600
Monongahela River.....	972,861	609,057

¹Figures throughout this table have been reduced to uniform basis of short tons.

²Includes coal received from connecting lines.

³Includes company's coal.

⁴December, 1911, figures.

⁵Does not include company's coal hauled free.

OHIO COAL TRAFFIC STATEMENT

Comparative statement of bituminous shipments over the principal Ohio railroads for January, 1911-12, in short tons:

	1911	1912
Hocking Valley.....	281,250	430,201
Toledo & Ohio Central.....	120,385	167,430
Baltimore & Ohio.....	176,979	212,945
Wheeling & Lake Erie.....	229,721	382,369
Cleveland, Lorain & Wheeling.....	189,807	268,641
Zanesville & Western.....	104,021	128,957
Toledo division, Penn. Co.	190,579	221,306
Lake Erie, Alliance & Wheeling.....	120,889	121,517
Marietta, Columbus & Cleveland Ry.....	3,498	9,658
Wabash, Pittsburg Terminal Ry.....	5,931	2,156
Kanawha & Michigan Ry.....	.....	17,526
Total.....	1,423,060	1,962,760

EXPORTS

Exports of coal from the United States for February of the current year were 927,339 tons as compared with 931,797 tons for the same month last year, both figures being exclusive of bunker or fuel coal laden on vessels in the foreign trade. Exports of anthracite for February this year were 231,684 tons as compared with 219,831 tons for the same month last year. The total exports of bituminous for February, 1912, were 695,655 tons as compared with 711,966 tons in February of last year, both figures being exclusive of bunker or fuel coal laden on vessels in the foreign trade. More than one-half of the total exports were shipped to Canada. Total

bunker or fuel coal laden on vessels in the foreign trade was, for February of the current year, 527,901 tons as compared with 496,602 tons for the same month last year.

Foreign Markets

GERMANY

The following is a statement of the production, imports and exports in the German Empire for the month of February, 1912, in metric tons:

	Production	Imports	Exports
Coal.....	14,644,304	642,086	2,721,612
Lignite.....	6,506,749	570,991	4,239
Coke.....	2,271,282	41,492	371,454
Briquettes.....	1,910,639	16,815	207,088

Financial Notes

Among stocks of other companies held by the Consolidation Coal Co. are 13,500 shares of the Northwestern Fuel Co., common stock, 2700 shares Northwestern Fuel Co., preferred stock, and 5011 shares of the Metropolitan Coal Co., common stock.

Details of consolidation of the Birmingham Coal & Iron Co. and the Woodward Iron Co., of Alabama, into the Woodward Iron Co., formation of which is a step in the renewal of the \$6,239,200 joint collateral trust notes of the Atlanta, Birmingham & Atlantic R.R. and the Atlantic & Birmingham Construction Co. have been completed. Value of ores and coal properties of the new corporation is \$124,435,100. Estimated coal holdings are 380,109,000 tons, valued at \$38,010,900.

Indications are that Colorado Fuel & Iron Co. will show a surplus for the year ending June 30 of something like \$1,500,000. That would be a substantial improvement over last year, with its surplus of approximately \$1,260,000, and an especially fine showing in view of the depression in the steel industry and in comparison with earnings of other steel companies. Earnings for eight months of the company's fiscal year are about \$126,000 ahead of last year. This corporation was one of the pioneers in the installation of openhearth furnaces for the manufacture of rails in place of the bessemer process, and the quality of its output has a wide and favorable reputation. Its rail mills are operating at fullest capacity, and orders on the books at present are for capacity nearly 12 months ahead.

The newly formed Woodward Iron Co. in Alabama will have \$13,000,000 capital stock, of which \$3,000,000 is 6% cumulative preferred and the balance common, and \$25,000,000 5% 40-year sinking fund bonds, of which \$13,500,000 will be issued. Of the \$13,500,000 bonds which mature Jan. 1, 1952, \$2,000,000 will be issued to retire a similar amount of first mortgage 5% bonds of the Birmingham Iron Co.; \$9,000,000 to pay for properties acquired; \$2,500,000 for immediate improvements and expenses of consolidation and \$11,500,000 will be reserved for future additions and betterments. The Birmingham Iron Co. bonds are redeemable at 105 and the premium, as well as discount on bonds sold, is to be paid as an expense of consolidation. The Woodward Iron Co., of Alabama, one of the principals in the consolidation, has no notes or debts outstanding except current operating liabilities.